SHAKE HANDS WITH
THE APPLE
II PLUS

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Preface

In teaching computer operation to post secondary students we found that the available manuals assumed an understanding of computing terminology. We realised that there was a need for a simplified guide for the beginner who has little or no knowledge of computers or computing terms.

Shake Hands with the Apple has been designed to meet that need.

We have enjoyed writing this book — we sincerely hope that you will enjoy learning to operate a computer.

Pam and Joy

Contents

— CHAPTER 1 —
Introduction to the Apple

"SHAKE HANDS WITH THE APPLE" has been designed as an individualised
programme to help you to learn the operation of the APPLE II PLUS
Microcomputer.

All operating instructions relate specifically to the APPLE II PLUS
Microcomputer. Some of these operating instructions will also apply
to other versions of Apple microcomputers, but may not apply to other
brands of computers.

However, the knowledge of APPLE II PLUS operation will enable users to
understand how other computers operate.

Courtesy of Electronic Concepts Pty Ltd

All computer systems consist of:-

Hardware: the physical components of the computer, and

Software: the programmes which enable the hardware to be used.

A BRIEF EXPLANATION OF TERMS

1. The Core of the Apple

Inside the APPLE II PLUS are a number of parts which enable the microcomputer to operate. Some parts of the core are:-

<u>Microprocessor</u> - collects information, follows instructions and produces results.

<u>Memory Banks</u> -

(i)   <u>Read-Only Memory (ROM)</u> - contains permanent programmes to understand and respond to the commands. This memory is constant, i.e. it never changes.

(ii)   <u>Random-Access Memory (RAM)</u> - data and/or instructions entered at the keyboard or obtained from diskette or cassette are temporarily retained in Random Access Memory (RAM) to enable the current task to be performed. This memory is not constant - i.e. it retains information only as long as the computer is switched on. All information stored in RAM is lost when the power supply to the computer is turned off.

<u>Connection points</u> for accessories, e.g. display screen, disk drives, cassette recorder, printer, game paddles.

<u>Circuit boards</u> with integrated circuits:

(i)   the main circuit board - located in a horizontal position behind the keyboard, and

(ii)   special circuit boards which are located vertically in the slots at the rear of the APPLE II.

Courtesy of Electronic Concepts Pty Ltd
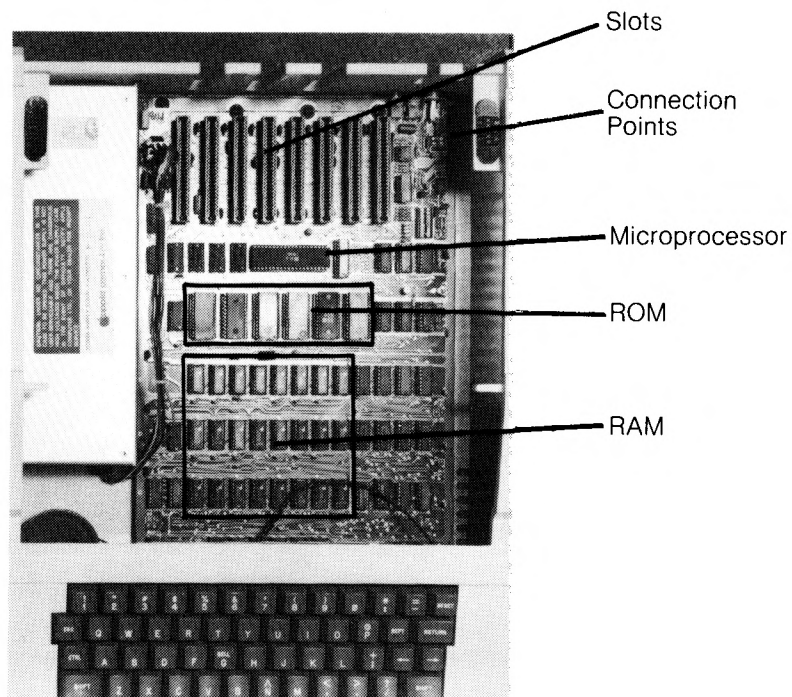
2. Display Screen

The display screen may be a television monitor or television set (either colour or black and white).

The screen will display:

(a) information and instructions entered through the keyboard, and

(b) the results of your instructions.

3. Keyboard

You will communicate with the APPLE II PLUS by using a keyboard very similar to a typewriter keyboard.

The keyboard is displayed below. Study it carefully and you may refer to it when new keys are introduced.
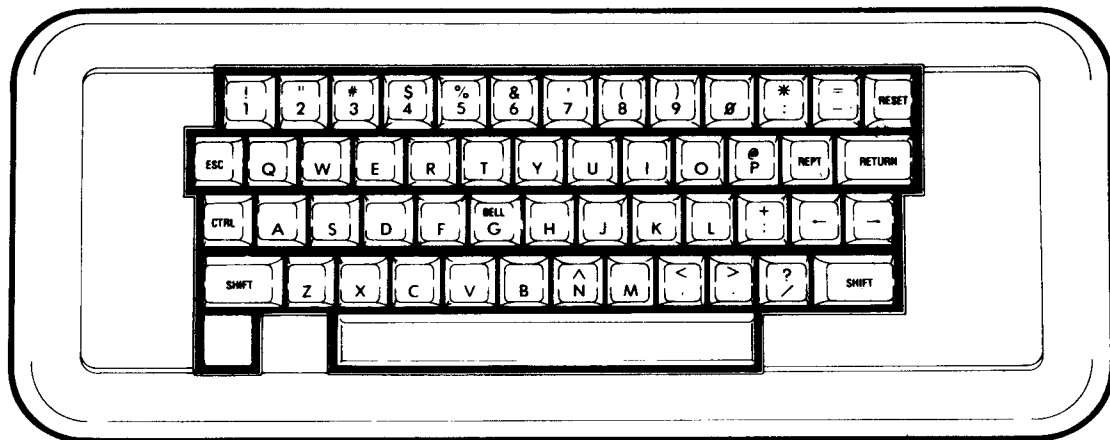
Courtesy of Electronic Concepts Pty Ltd

4. Disk Drive

The disk drive enables diskettes to be used to transfer information (called data) to and from the RANDOM ACCESS MEMORY (RAM) and to provide a means of storing programmes developed on the computer.

The operation of the disk drive can be compared to that of a cassette player. When the disk drive door is closed (similar to depressing "Play" button on cassette player) the "head" is lowered towards the diskette to read the contents.

5. Cassette Recorder

You may also use a good quality cassette recorder to transfer programmes and data on cassette tape to and from the RANDOM ACCESS MEMORY (RAM).

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6. Diskettes

A diskette is a circular vinyl disk protectively enclosed in a
flexible plastic envelope. A slot in the envelope allows access for
the head of the disk drive to read the contents of the diskette, while
a notch on the side of the envelope will determine whether information
may be written to the diskette. If this notch is covered, the
diskette is "write protected", i.e. new information cannot be recorded
on the diskette and so the information already on the diskette will
not be destroyed.

7. Cassettes

Audio cassettes may be used for storage of programmes, for loading
pre-recorded programmes into the computer and for storing your own
programmes.

8. Printer

The printer is used to produce a printed copy of output from the
microcomputer.

There are a number of printers which may be connected to the APPLE II
PLUS. Depending on the brand of printer connected to the computer,
the correct size and type of paper must be available.

9. Languages

The APPLE II PLUS can operate with a number of computer languages.

One of the easiest computer languages for beginners to learn is known
as BASIC.

BASIC is an acronym for:

Beginners All-purpose Symbolic Instruction Code.

The APPLE II PLUS supports two versions:

        APPLESOFT BASIC   and

        INTEGER BASIC

All instructions in this book relate to APPLESOFT BASIC.

— CHAPTER 2 —
The First Handshake

In this section, you do not use diskettes or cassettes.

You will be working under the directions of the programmes permanently stored in the READ-ONLY MEMORY (ROM), and all data and/or instructions entered at the keyboard will be temporarily stored in RANDOM-ACCESS MEMORY (RAM).

STARTING THE SYSTEM

1. Turn the machine on by the power switch located at left rear of the machine next to the power cord inlet. Push the switch up.

2. The power light (bottom left of keyboard) should now be ON. Title "APPLE II" will appear at top of screen.

3. If the screen displays: *

    depress and hold CONTROL (CTRL) and depress B.
    Then depress RETURN.   Now go to Step 6.

4. If the screen displays   ]   go to Step 6.

5. If the screen displays nothing and a disk drive unit is connected:

    (a) The red IN USE light on the disk drive unit will light up and the motor will start to whirr. As no diskette is inserted it is on an ENDLESS SEARCH. This basically means that the head in the disk drive is trying to read what is on the diskette, but as no diskette is inserted it will continue this fruitless search.

    (b) Press RESET key on upper right of keyboard. (On some models of the APPLE II depress CONTROL and RESET together.) Computer will BEEP when RESET is released.

    (c) Two symbols will appear at the bottom of the screen. If these symbols did not appear, depress RESET again - or turn machine OFF and then ON. Repeat Step (b).

6. The screen will now display two symbols - a prompt (]) and a flashing cursor (■).

    The prompt indicates the type of BASIC language that the computer will read.

    Prompt]   = APPLESOFT BASIC   Prompt >   = INTEGER BASIC

    The CURSOR (■) indicates the typing position on the screen.

7. Although the BASIC languages are very similar, it would be preferable to use APPLESOFT BASIC while you are learning the operation of the APPLE II PLUS.

8. To get APPLESOFT BASIC:

   If the prompt on the screen is:

   INTEGER BASIC as shown by   >   Type FP

   MONITOR   as shown by   *   Press RESET

A QUICK LOOK AT THE KEYBOARD

The keyboard is very similar to the keyboard of an ordinary typewriter, but there are important differences.

1. Touch

Touch will be slightly different from that of an electric typewriter and totally different from a manual typewriter.

2. Capitals

All typing is in upper case, i.e. capital letters.

3. Figure Ø

Note the difference between letter O and figure zero i.e. Ø. If you type a number containing a zero, you must use the figure Ø.

4. Figure 1

The figure 1 must be used for numerical work. Some typists use lower case L to indicate a 1 - the computer will not accept this.

5. Shift Key

Depressing the shift key, in conjunction with other keys, will produce additional characters, which are shown on the top portion of these other keys.

> e.g. depress and hold Shift; depress 4 (abbreviated to Shift 4) - produces $.

There are two other uses for the Shift key which are not shown on the keys.

> e.g. Shift M produces a right hand square bracket (]).
>
> Shift G produces a G, BUT by holding down the CONTROL key and pressing G, the computer will BEEP.

6. Special Keys and their Uses

(a) RESET
- Do not use RESET unless instructed.
- Will always stop computer operation.
- May cause a language prompt to appear.

(b) RETURN
- RETURN is normally used to indicate to the computer that you have finished typing an instruction.

(c) CONTROL
- Used in conjunction with another key to perform additional functions. More about these later.

(d) ESCAPE
- Used before another key to perform additional functions. More about these later.

(e) REPEAT
- Allows another key to be repeated. Depress and hold the key you wish to repeat, and then press REPT.

(f) BACKSPACE
◄—
- Moves the cursor back one or more spaces and wipes out the characters over which it has passed.

- Although those characters still remain on the screen, they have been erased from the computer memory.

- Use the backspace key to position the cursor over the incorrect character, then simply retype the correct character.

(g) RETYPE
—►
- Moves the cursor forward one or more spaces.

- If the cursor passes over a character, that character will be retyped without you touching the relevant key and replaced in computer memory.

(h) SPACE BAR
- When Space Bar is used to space over previous typing, it removes those characters from the screen and from the computer memory.

KEYBOARD PRACTICE

Type this section to practise keyboarding until you become familiar with the different touch required. Read the following comments before you commence typing.

1. For your keyboarding practice, you do not need to use RETURN.
    As you type, the cursor moves across the screen and then continues
    on to the next line i.e. you do not need to press RETURN to go to
    the next line.

    If you accidentally press RETURN during your keyboard practice,
    the message "SYNTAX ERROR" will appear on the screen. Ignore
    this message during your keyboard practice.

2. The first line of typing commences at the bottom of the screen and
    as further information is typed the display gradually moves up the
    screen.

3. If you make a typing error, remember to use the BACKSPACE key to
    backspace to the incorrect letter, then type in the correction,
    then use the RETYPE key to automatically retype characters
    previously cancelled.

4. The screen will display 40 characters across the screen and
    24 lines down the screen. (If your computer has an 80 column
    card installed, the screen will display 80 characters across
    the screen.)

5. If you type more than about 240 characters, the computer will
    start to BEEP, then will place a backslash (\ ) on the cursor
    position and move the cursor to the next line to allow you to
    start typing again.

WHEN THE SCREEN IS FULL, TRY THE NEXT SECTION.

HOW TO CLEAR THE SCREEN

Method 1   - Depress ESC key then release, type @ (Shift P).

             - SCREEN IS TOTALLY CLEARED.

             - Cursor has returned to top left of the screen which is
               called HOME position.

Type the previous section again to continue keyboard practice until
the screen is filled again. Then try Method 2 to clear the screen.

Method 2   - Depress RETURN to position cursor at left margin.

             - Type HOME, press RETURN.

             - SCREEN IS TOTALLY CLEARED.

             - Cursor has returned to top left of screen (HOME
               position).

SOME EDITING FEATURES   or   HOW TO CORRECT ERRORS

Type the previous section to improve your keyboard skills and practise
these editing features.

1. BACKSPACE   – moves cursor to left to allow correction
                     of typing error.

                  – characters passed over by the cursor are erased
                     from memory, but not from screen.

2. RETYPE   – moves cursor to right.

                  – automatically retypes the characters passed over by
                     the cursor, and replaces them in memory.

3. REPEAT   – depress BACKSPACE and REPT together.

                  – cursor moves quickly to left until keys are
                     released.

                  – characters are wiped from memory, but not from
                     screen.

                  – depress RETYPE and REPT.

                  – cursor moves quickly to right until keys are
                     released.

                  – characters are retyped and replaced in memory.

4. CONTROL-X   – press and hold CTRL, type X.

                  – places a backslash (\ ) at cursor.

                  – cancels the whole line from memory, but not
                     from screen.

PURE CURSOR MOVES   -   to make editing easier!

It is possible to move the cursor and make corrections without affecting any of the information on the screen or in memory. This is done by using PURE CURSOR MOVES. Practise each of these moves.

To move one space in any direction

1. ESC-A   - to move cursor to RIGHT.

           - depress ESC, release, depress A.

           - cursor moves one position to right.

           - does not affect display or memory.

2. ESC-B   - to move cursor to LEFT.

           - depress ESC, release, depress B.

           - cursor moves one position to left.

           - does not affect display or memory.

3. ESC-C   - to move cursor DOWN the screen.

           - depress ESC, release, depress C.

           - cursor moves down one line.

           - does not affect display or memory.

4. ESC-D   - to move cursor UP the screen.

           - depress ESC, release, depress D.

           - cursor moves up one line.

           - does not affect display or memory.

To make corrections

           Make pure cursor moves one space at a time, either right, left, up or down to incorrect character.

           Type the correct character.

           Make pure cursor moves back to original typing position.

To move cursor more than one space in any direction

The next group of PURE CURSOR MOVES are easier and faster if you want
to move the cursor more than once in any direction to make
corrections. These moves do not affect display or memory.

Pressing ESCAPE places the computer in EDIT mode.

In EDIT mode, the direction keys (K, J, M, I)
can be depressed more than once, or alternatively
depress direction key and also the REPEAT key
for rapid movement.

```
      I
      ↑
J ←── | ──→ K
      ↓
      M
```
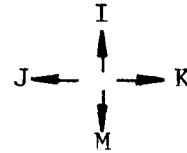
To finish EDIT mode, press space bar.
Then make correction.

1. ESC-K   - to move cursor to RIGHT.

                 - depress ESC, release   (now in EDIT mode).

                 - depress K (more than once, or use REPT key).

                 - cursor will move to right.

                 - when cursor at required position, press space
                   bar to finish EDIT mode.

2. ESC-J   - to move cursor to LEFT.

                 - depress ESC, release   (now in EDIT mode).

                 - depress J (more than once, or use REPT key).

                 - cursor will move to left.

                 - when cursor at required position, press space
                   bar to finish EDIT mode.

3. ESC-M   - to move cursor DOWN the screen.

                 - depress ESC, release   (now in EDIT mode).

                 - depress M (more than once, or use REPT key).

                 - cursor will move down the screen.

                 - when cursor at required position, press space
                   bar to finish EDIT mode.

4. ESC-I   - to move cursor _UP_ the screen.

            - depress ESC, release (now in EDIT mode).

            - depress I (more than once, or use REPT key).

            - cursor will move up the screen.

            - when cursor at required position, press
              space bar to finish EDIT mode.

To make corrections

Make pure cursor moves to position of error.

Press space bar to finish EDIT mode.

Type correction.

Make pure cursor moves back to original typing
position.

Press space bar to finish EDIT mode.

Continue typing.

When the cursor reaches:

1. the top of the screen - it will stop.

2. the bottom of the screen - the cursor remains stationary, but the
    printing on the screen moves up.

3. the right edge of the screen, with further moves right - it will
    reappear at the left margin one line lower.

4. the left margin of the screen, with further moves left - it will
    reappear on the right edge, one line higher.

NOTE:

Pure Cursor moves can also be used to correct errors in a statement
within a programme.

This method of correction will be explained further, after you have
covered the instructions for entering a programme.

DIFFERENCES BETWEEN PURE CURSOR MOVES AND BACKSPACE/RETYPE MOVES

The BACKSPACE key will cancel characters over which it passes and the
RETYPE key will replace characters over which it passes.

PURE CURSOR moves do not cancel characters from screen or memory.

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TO CLEAR PORTION OR ALL OF SCREEN DISPLAY

These commands will remove a portion or all of the screen display.
Try each command in conjunction with some of the PURE CURSOR moves you
have learned.

1. ESC-E   - depress ESC and E together.

                  - clears all characters from cursor to end of line,
                    from screen and memory.

2. ESC-F   - depress ESC and F together.

                  - clears all characters from cursor to end of screen,
                    from screen and memory.

3. ESC-@   - do you remember this one?

                  - depress ESC, release, depress @ (Shift P).

                  - clears entire screen.

                  - cursor returns to HOME position.

4. HOME   - you should remember this one too!

                  - depress RETURN, type HOME, depress RETURN.

                  - clears entire screen.

                  - cursor returns to HOME position.

SUMMARY

If you have practised all the steps in this chapter, you should now be
good friends with the APPLE II PLUS. You have learned:

      how to start the system,

      how to recognise the APPLESOFT BASIC and INTEGER BASIC languages
      by the prompt,

      the keyboard and its special keys,

      how to communicate with the computer through the keyboard,

      how to make corrections and

      how to clear the screen.

— CHAPTER 3 —
Immediate Execution of Commands — Part 1
The Print Command

The functions explained in this chapter are available under the
directions of the programmes permanently stored in READ-ONLY MEMORY
(ROM). All data and/or instructions entered at the keyboard will be
temporarily stored in RANDOM-ACCESS MEMORY (RAM). You will not need
to use either a diskette or cassette.

When you were practising your keyboarding skills, you did not have to
use the RETURN key at the end of each line. If you accidentally
pressed RETURN, the message SYNTAX ERROR appeared on the screen, which
you were told to ignore.

In fact, the RETURN key has a special function - it is a signal to the
computer that you have finished typing an instruction - now the
computer must obey your instructions.

A word of warning though - if you type an instruction, press RETURN,
and the message SYNTAX ERROR appears, the computer is telling you -
"You have made an error - I cannot read your instruction".

If this happens, check your instruction carefully and then retype
correctly.

If you notice a typing error before you press RETURN, use the
BACKSPACE and RETYPE keys to correct the error.

NOW - either CLEAR SCREEN or

    - TURN MACHINE ON and call up prompt and cursor.

THE PRINT COMMAND

1. Type   PRINT "HELLO"   then press RETURN.

2. The computer has followed your instructions - it has printed
    the word HELLO.

> NOTE: Any characters enclosed in quotation marks will be
>   printed exactly by the PRINT command. The first
>   quotation mark indicates that the following
>   character is the start of the material to be printed,
>   while the second quotation mark indicates that the
>   material to be printed has been completed.

3. Type PRINT "MY NAME IS _____."   Press RETURN.

4. Try PRINTing some more words and short sentences, remembering to
    press RETURN when you have finished typing your instruction.

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You should understand the function of the RETURN key by now, so the instruction – press RETURN – will not be shown in the following instructions.

5. What happens if you forget to type the first quotation mark?
    Try it.

    Type   PRINT YOUR NAME"

    The result – Ø – the computer could not read your command as there was no opening instruction.

6. Type   PIRNT "YOUR NAME" – deliberately misspelling PRINT to see the computer's reaction.

    The result – SYNTAX ERROR – computer could not read your instruction.

7. Type   PRINT "1234"   Result?

8. Type   PRINT 1234   Result?

    NOTE: Numbers will be printed exactly whether enclosed or not enclosed in quotation marks.

9. Type   PRINT "30 JUNE 1982"   Result?

10. Type   PRINT "30/6/1982"   Result?

11. Type   PRINT 30/6/1982   What happened?

    The computer reads a / as meaning "divide by", so in this example 30 was divided by 6, giving 5, and 5 was divided by 1982.

    NOTE: To print an exact copy of a mixture of numerics and non numerics, all characters must be enclosed in quotation marks.

Practise this section until you feel confident about PRINTing an exact copy of any characters.

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ABBREVIATED PRINT COMMAND

When you are using APPLESOFT (prompt]), the PRINT command can be
shortened to a question mark.

1.   PRINT "JANUARY"   (and RETURN of course)
     ? "JANUARY"   Was the result the same?

From now on, if you are using APPLESOFT, you may use either the word
PRINT or the question mark.

MULTIPLE PRINT

APPLESOFT allows you to use the PRINT command more than once in the
same line. Try this example.

1.   PRINT "MONDAY" : PRINT "TUESDAY"   Result?

     NOTE: The colon is used to indicate a following PRINT.

LENGTH OF PRINT STATEMENT

You can instruct the computer to PRINT a longer message. However,
there is a limit to the length of the message. If the message
contains more than about 240 characters, the computer will interrupt
your typing with a BEEP and a backslash, and move the cursor to the
next line.

In APPLESOFT, the computer will PRINT up to about 240 characters,
if you stopped typing before the backslash appeared.

BUT - if the backslash has appeared, your statement will not be
printed at all. In fact, you will get a SYNTAX ERROR message to
let you know that the computer is unable to follow your instruction.

Trial this yourself, to see the computer's reaction.

Use the first paragraph of this section, which contains more than 240
characters, as your message.

Remember though that you must not use the RETURN key to continue
typing on the next line.

        PRINT "You can instruct the computer ...."

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METHODS OF DISPLAY

There may be occasions when you want to space your work across the screen, or close-print your work. Try the following methods.

1.   PRINT "HEADING", "HEADING", "HEADING"

The comma instructed the computer to print the words in columns.

2.   PRINT "MONDAY"; "TUESDAY"; "WEDNESDAY"

The semi-colon instructed the computer to print the word in the next space.

How could you get a space between the words so that they do not run together?

Try   PRINT "MONDAY ";"TUESDAY ";"WEDNESDAY"

By leaving a space after the last letter of each word, the printing will also leave a space.

3.   PRINT TAB(5);"MONDAY";TAB(20);"TUESDAY"

The word TAB instructed the computer to PRINT the words at the character position on the line indicated by the figure enclosed in brackets. Notice that the semi-colon must be used after the TAB input.

PRACTISE THESE METHODS WITH SOME EXAMPLES OF YOUR OWN.

COMBINING SOME PRINT INSTRUCTIONS

So far, you have found out that:

(a)   PRINT or ? are commands to the computer to print your message.

(b)   The comma is an instruction to print in columns.

(c)   The semi-colon is an instruction to close-print.

(d)   The colon allows more than one PRINT command in a line.

(e)   The TAB command instructs printing at a specified line position.

Let's try combining some of these instructions.

1. PRINT "EXAMPLES ","OF ","DISPLAY"

2. PRINT TAB(5);"EXAMPLES", "OF", "DISPLAY"

3. PRINT TAB(5);"EXAMPLES";TAB(20);"OF";TAB(30);"DISPLAY"

4. PRINT "EXAMPLES" :?"OF" :?"DISPLAY"

Try some of your own combinations and also some longer messages.
Think carefully about the display you want, and make sure that you
give the computer the correct instructions.

SUMMARY

1. Any characters enclosed in quotation marks will be printed
    exactly.

2. Numbers will be printed exactly whether enclosed or not enclosed
    in quotation marks.

3. A mixture of numerics and non numerics must be enclosed in
    quotation marks.

4. The PRINT command can be abbreviated to a question mark.

5. The PRINT command may be used more than once in the same line
    by using a COLON.

6. The length of a PRINT statement must not be more than about
    240 characters.

7. The COMMA is an instruction to print in columns.

8. The SEMI-COLON is an instruction to close-print.

9. The TAB command instructs printing at a specified line position.

— CHAPTER 4 —
Immediate Execution of Commands — Part 2
Mathematical Symbols

By the time you start this chapter, you already know that you must type PRINT or ? to command the computer to print your message. So - from now on - the command PRINT will not be shown.

Remember - you are still working under the direction of permanent programmes in READ-ONLY MEMORY (ROM). Keyboard entries are temporarily stored in RANDOM-ACCESS MEMORY (RAM).

Either CLEAR SCREEN or

TURN MACHINE ON and call up prompt and cursor.

SYMBOLS FOR MATHEMATICAL FUNCTIONS

The computer can be used to supply answers to mathematical problems.

Use the following symbols:

+	Addition
–	Subtraction
*	Multiplication
/	Division
$\wedge$	Exponentiation (e.g. squaring)
$\wedge$ (1/2)	Square Root of...(or Exponentiation to the 1/2 power)

When you are typing the following problems, you can:-

(a) Leave a space between characters, e.g. 4 + 4

(b) Leave no space between characters, e.g. 4+4

Either way, the computer will read your instructions.

ADDITION

1. 4 + 4   (Did you remember the PRINT command and RETURN?)

2. 75 + 17

   NOTE: The computer will supply only the answer. To make the result more meaningful, type

   "75 + 17 = ";75+17   Result   75 + 17 = 92

   If you use a comma after the closing quotation mark, the answer will be printed in the next column.

   e.g.   "75 + 17 = ", 75 + 17

3.   "110 + 78 + 97 = ", 110+78+97

What happens if you leave out the first quotation mark?
Try it and see.

The message you received (TYPE MISMATCH ERROR) tells you
that the computer cannot understand your instruction.

4.   "4 + 6 = ";4+6

What happens if you enter the wrong figures?
Try this.

"4 + 5 = ";4+6

Result   4 + 5 = 10   which you know is wrong!

BUT the computer followed your instructions by:

        (a) PRINTing the quoted figures   4 + 5 =
        (b) Adding the numbers 4+6   10

SO you must be very careful in entering data - always
check your typing before pressing RETURN.

TRY THE FOLLOWING:

SUBTRACTION

1.   117 - 36

2.   "42 - 19 = ";42-19

3.   "176 - 28 - 43 = ";176-28-43

MULTIPLICATION

1.   42 * 6

2.   "17 * 31 = ";17*31

3.   "82 * 4 * 12 = ";82*4*12

DIVISION

1.   1776/12

2.   "273/13 = ";273/13

3.   "3976/4/7 = ";3976/4/7

SQUARING OR CUBING A NUMBER

1.   5 ∧ 2   i.e. 5 * 5

2.   "6 ∧ 3 = "; 6 ∧ 3   i.e. 6 * 6 * 6

FINDING THE SQUARE ROOT OR CUBE ROOT

1.   25 ∧ (1/2)   i.e. square root of 25

2.   It is much easier to use the SQR function
     e.g. SQR (49)   SQR (23104)

3.   216 ∧ (1/3)   i.e. cube root of 216

USING DECIMALS

APPLESOFT allows decimal numbers to be used in all calculations. There are some points you should remember though.

1.   If you add 10.14 and 2.16 the answer is 12.30.
     The computer will print   12.3   i.e. it will not print trailing zeros.

2.   If you add 033.62 and 021.20 the answer is 054.82.
     The computer will print   54.82   i.e. it will not print leading zeros.

ROUNDING IN APPLESOFT

If you type a number with more than nine digits, or if the answer to a problem contains more than nine digits, the computer will round the number to nine digits.

e.g.   Type   PRINT 2345.67891234

         Result 2345.67891   Rounded down because tenth digit
                             was less than 5.

         Type   PRINT 2345.67898933

         Result 2345.67899   Rounded up because tenth digit
                             was equal to or greater than 5.

SCIENTIFIC NOTATION

If you type in a long number, the result may be shown with an included letter E, e.g. Type PRINT 1234567899876543   Result?

This is called scientific notation. Unless you understand scientific notation, use simpler calculations.

COMBINATIONS OF SYMBOLS

1. Addition and Subtraction

202 - 57 + 143 - 98

Calculations are performed from left to right.

2. Addition, Subtraction and Multiplication

202 + 57 - 25 * 2

The multiplication is performed first.

Then additions and subtractions are performed from left to right.

3. Addition, Subtraction, Multiplication and Division

987 + 17 - 30 * 2 + 88/11

The multiplications and divisions are performed first,
from left to right.

Then additions and subtractions are performed from left to right.

4. Addition, Subtraction, Multiplication, Division and Exponentiation.

10 ∧ 3 + 1079 + 10 * 6 - 31/16 - 4 ∧ 2

Exponentiation (e.g. squaring) is performed first, from left to right.

Then multiplications and divisions are performed from left to right.

Then additions and subtractions are performed from left to right.

THE COMPUTER HAS DEFINITE RULES FOR PERFORMING CALCULATIONS.

THESE RULES ARE CALLED "ORDER OF PRECEDENCE".

ORDER OF PRECEDENCE

ORDER OF PRECEDENCE determines the order of the steps for all mathematical calculations.

Step 1	( )	Any calculation enclosed in brackets, from left to right.
Step 2	-	Negative numbers.
Step 3	∧	Exponentiation from left to right.
Step 4	* /	Multiplications and divisions from left to right.
Step 5	+ -	Additions and subtractions from left to right.

RULE   If there is more than one calculation using the same symbol, calculations are performed from left to right.

STUDY THIS EXAMPLE AND FOLLOW THE STEPS:

$$-2 + 20 + 120 + 6/3 - 4 * (2 + 10) + 6 \wedge 2$$

Step 1 Brackets $-2 + 20 + 120 + 6/3 - 4 * \underline{(2 + 10)} + 6 \wedge 2$

Step 2 Negative No. $\underline{-2 + 20} + 120 + 6/3 - 4 *\quad 12 \quad+ 6 \wedge 2$

Step 3 Exponentiation $18 \quad+ 120 + 6/3 - 4 *\quad 12 \quad+ \underline{6 \wedge 2}$

Step 4 Multiplication
and Division $18 \quad+ 120 + \underline{6/3} - \underline{4 *\quad 12} \quad+ 36$

Step 5 Addition and
Subtraction $\underline{18 \quad+ 120} + 2 -\quad 48 \quad+ 36$

GETTING THE RIGHT ANSWER EVERY TIME

Work these examples yourself (without the computer!) and then check your answers on the computer.

$$6 * 6/2 + 4 * 6 \wedge 2 + 10$$

$$10 * 4 * -2 + 10 * 5 \wedge 3$$

Notice the different results in the next two problems because of the inclusion of brackets.

$$10 + 2 * 4 - 6/3 = \qquad (16)$$

$$(10 + 2) * (4 - 6/3) = (24)$$

Now work some examples of your own — without the computer — and then check your answers on the computer.

SUMMARY

1. Symbols for mathematical functions:

+	Addition
−	Subtraction
*	Multiplication
/	Division
∧	Exponentiation
∧ (1/2)	Square root of...

2. Leading and trailing zeros will not be printed.

3. Numbers containing more than nine digits will be rounded to nine digits.

4. Order of Precedence:

    Brackets
    Negative numbers
    Exponentiation
    Multiplication and Division
    Addition and Subtraction

MATHEMATICAL FUNCTIONS

There are a number of built-in mathematical functions available with the Apple II Plus.

If you intend to use the computer for more complex mathematical problems, then you should check the Reference Manuals supplied with the computer for a complete listing of these functions.

— CHAPTER 5 —
Immediate Execution of Commands — Part 3
Variables

Either   CLEAR SCREEN   or

   TURN MACHINE ON and call up prompt and cursor.

Remember - ROM contains the programmes to process your instructions.
       RAM contains the data and/or instructions entered via the
       keyboard.

PIGEONHOLES   or   STORAGE LOCATIONS IN MEMORY

Every computer has the capability of storing information for later
use. Using the APPLESOFT language, there are over 900 pigeonholes
into which data can be placed and recalled later. You - as the
operator - can name each pigeonhole so that you will know where to
find any data.

In this section, you will use the letters A B C D E F as names
for six pigeonholes.

STORING DATA IN MEMORY

(Do not use the PRINT command.)

       Type   A = 344   (and of course RETURN)
                  B = 125
                  C = 22
                  D = 5
                  E = 55
                  F = 4

Each number has now been placed in its own pigeonhole.

RETRIEVING DATA FROM MEMORY

Instruct the computer to PRINT the contents of each pigeonhole.

           PRINT A, B, C
           PRINT D, E, F   All correct?

CHANGING DATA IN MEMORY

       Type   A = 225   PRINT A

What happened? The previous data (344) has been removed from the
pigeonhole and cancelled from memory, and has been replaced by the new
data (225).

PERFORMING CALCULATIONS WITH DATA IN MEMORY

Instruct the computer to carry out these tasks.

Remember the command PRINT and RETURN.

Use the mathematical symbols you have already learned.

1. A plus B plus C

2. E minus D minus F

3. A multiplied by E multiplied by C

4. B divided by D

5. A plus D multiplied by F

6. A plus B divided by D

7. D squared

8. D cubed

9. Square root of B

10. Cube root of B

11. C multiplied by (E plus A)

12. A minus (F multiplied by D) plus (B plus C)

After doing those calculations, check the contents of the pigeonholes again - they should be the same as before.

```
PRINT A, B, C
PRINT D, E, F
```

Try some calculations of your own, using the data already stored in the pigeonholes.

CLEARING DATA FROM MEMORY

When you have finished your calculations, you can clear all the pigeonholes and set them to zero by either of the following methods:

Type   CLEAR

Type   NEW

NUMERIC VARIABLES

The correct name for pigeonholes is VARIABLES. This is the term that will be used from now on.

In the previous examples, you used a letter to identify each VARIABLE.

All the data you used was NUMERIC i.e. numbers only.

> NOTE: When the data is ALL NUMERIC, you can use one
> letter to identify each NUMERIC VARIABLE.
> Numeric variables can be any letter from A to Z.
>
> (In advanced programming there are other combinations
> but - for now - use one letter only.)

STRING VARIABLES

What happens if you want to store data that is not all numeric?

Data that is not all numeric is called STRING DATA. It consists of a STRING of letters (alphabetic) or a mixture of letters and numbers (alphanumeric).

STRING DATA must use a STRING VARIABLE which is a letter followed by a dollar sign ($).

STRING DATA must be enclosed in quotation marks.

> NOTE: When the data is ALPHABETIC or ALPHANUMERIC, you
> can use one letter (from A to Z) followed by a
> dollar sign ($) to identify each STRING VARIABLE.
>
> (In advanced programming there are other combinations
> but - for now - use one letter followed by dollar
> sign.)

Try these examples

> Type   A$ = "STRING DATA "   (and RETURN of course)
> B$ = "IN QUOTATION MARKS"
> PRINT A$; B$

> Did you notice that there is a space after DATA and before
> the quotation marks?

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USING NUMERIC AND STRING VARIABLES

```
Type      A = 11
          B = 14
          M$ = "MARY IS "
          R$ = "ROGER IS "
          Y$ = " YEARS OLD"
          PRINT M$; B; Y$
          PRINT R$; A; Y$
```

Try some examples of your own, combining NUMERIC and STRING VARIABLES. When you have finished, remember NEW or CLEAR to clear all variables.

USING WORDS TO IDENTIFY DATA

You can also use a word to identify a variable, but there are some rules to remember.

1. Some words have special meanings in BASIC and these cannot be used as variable names. If you do use one of the RESERVED WORDS, the computer will respond with SYNTAX ERROR, letting you know that you must select another name.

2. Select words that will convey a meaning to you.

3. The computer uses only the first two letters of any word to identify a variable. So make sure that the words you use do not contain the same first two letters.

Now let's try a simple problem, using words as variable names.

If the PRICE of an article is $17.58 and the NUMBER you wish to buy is 48, how much will this COST you?

```
          PRICE = 17.58
          NUMBER = 48
          PRINT "COST = ";PRICE * NUMBER
```

Try some other problems, selecting your own variable names and data.

When you have finished practising, remember

```
          CLEAR   or   NEW      to clear all variables.
```


SUMMARY

1. Numeric Variables — use any letter from A to Z

2. String Variables   — use any letter from A to Z followed by a dollar sign ($).

3. Reserved Words   — some words have special meanings and may not be used as Variables.

— CHAPTER 6 —
Deferred Execution of Commands — Part 1
Simple Programmes

Deferred execution simply means that you are going to input a number of instructions, to be performed later. This is really writing a simple computer programme.

Either   CLEAR SCREEN   or

       TURN MACHINE ON and call up prompt and cursor.

SIMPLE PROGRAMMES

1. Input <u>exactly</u> as shown.


```
        NEW
        10 REM MY FIRST PROGRAMME
        20 PRINT "EXERCISE NO. 1"
        30 PRINT "YOUR NAME"          (Insert your own name)
        40 PRINT "NUMBER AND STREET"  (Insert your own street)
        50 PRINT "SUBURB"             (Insert your own suburb)
        60 PRINT "PHONE NUMBER"       (Insert your own number)
        9999 END


        LIST      (watch computer reaction to this instruction)


        RUN       (watch computer reaction to this instruction)
```

2. What happened?

The computer followed your instructions by:

(a) storing your statements (numbered 10 to 9999) in RAM,

(b) LISTing your statements for you to check, and

(c) RUNning your instructions under the direction of programmes stored in ROM.

3.   Let's look closely at each part of your programme.

NEW

This is an instruction to the computer to wipe out previous data stored in memory and to store a brand new programme.

STATEMENT NUMBERS e.g. 10 to 9999

The computer stores statements in ascending order, i.e. lowest to highest. It is always a good idea to increase statement numbers by 10 (as you did), in case you have to insert extra statements when you are checking the programme.

REM

Short for REMARK.

REM statements are for reference purposes only – the computer does not act on them.

Helpful to identify and clarify your programme.

END

Signifies to computer the END of the programme.

Must always have the highest statement number.

In APPLESOFT, the highest statement number you can use is 63999.

For your exercises, use 9999 to signify END.

NOTE: With the APPLE II it is not essential to use an END statement. However, it is good programming practice to do so.

LIST

Instruction to computer to LIST your programme on the screen so that you can check it.

RUN

Instruction to computer to obey your programme instructions.

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THE LIST COMMAND

When you typed LIST, the whole programme was listed on the screen. It is also possible to LIST portions of the programme.

LIST	Displays whole programme.
LIST 40	Statement 40 is displayed.
LIST 30,50	Statements from 30 to 50 are displayed.
LIST ,40	Statements from beginning to Statement 40 are displayed.
LIST 40,	Statements from Statement 40 to END are displayed.

THE RUN COMMAND

When you typed RUN, the whole programme was executed on the screen. You can also RUN portion of the programme.

RUN	Entire programme executed.
RUN 30	Programme executes from Statement 30.

INSERTING A STATEMENT

Your programme (Exercise No. 1) is still stored in computer memory.

Type LIST to display the programme on the screen.

Now you are going to insert three additional statements in your programme. Two statements will be to insert a blank line after "Exercise No. 1" and after "Your Name". The third insert will be your own Postcode and this will be positioned after your Suburb.

Type (at the cursor position)

```
25 PRINT
35 PRINT
55 PRINT "POSTCODE NUMBER"
```

LIST

Notice how the computer has re-organised the lines in ascending statement number.

RUN

CHANGING A STATEMENT

If you want to change the contents of a statement (or correct an error) you may use either of these methods.

To renumber your programme as Exercise No. 2:

METHOD 1   - retype the entire statement

           LIST   (entire programme)
   or   LIST 10,20   (selected lines)

  Then type:

           10 REM MY SECOND PROGRAMME
           20 PRINT "EXERCISE NO. 2"

METHOD 2   - If you do not wish to retype the statement, use:
                Pure Cursor moves - ESC I J K M

    (a) Type HOME to clear screen (optional).
    (b) Type POKE 33,33
    (c) LIST statement in which correction is to be made.
    (d) Depress ESC (to enter EDIT mode)
    (e) Depress I until cursor is positioned on listed line.
    (f) Depress J until cursor is positioned on first digit of statement number.
    (g) Depress SPACE BAR to finish EDIT mode.
    (h) Use RETYPE key ⟶ until cursor is positioned at correction point.
    (i) Type correction.
    (j) Use RETYPE key ⟶ to move to end of statement.
    (k) Depress RETURN.
    (l) Type POKE 33,40 (or TEXT) to return LISTing to normal display.

    LIST to check correction.   RUN.

  NOTE: To cancel character/s within quotation marks, use pure cursor move, ESC-K, instead of RETYPE key. The character/s will not be replaced in memory.

DELETING A STATEMENT

If you want to DELETE portion of your programme, e.g. to remove the exercise number

          LIST   or   LIST 20

  Then type:

          20   (this will delete the previous Statement 20)

  Next: LIST   (Statement 20 has been deleted)

        RUN

If you want to delete several successive lines, e.g. your address -

        LIST   or   LIST 40,55

Then type:

        DEL 40,55   (Statements 40 to 55 inclusive will
                                  be deleted)

Next:

        LIST   (Statements have been deleted)

        RUN

CLEARING THE SCREEN

You have already learned how to clear the screen in immediate
execution of commands. You can also clear the screen in deferred
execution.

      Type   LIST   (What's left of your programme is displayed!)

Now type
        70 HOME

        LIST   (to check)

        RUN

Screen is totally cleared.

Is your programme still in memory? Type LIST to find out.

You can also clear the screen by typing :

        HOME   or   ESC, @ (Shift P)

CLEARING THE MEMORY

The only way to clear your programme from memory is to type:

        NEW

Now try

        LIST   (Programme has been wiped from memory)

READABILITY

Did you notice that when a programme is LISTed, the computer has
inserted additional spaces to make it easier to read?

— CHAPTER 7 —
Deferred Execution of Commands — Part 2
Simple Programming

Now you are going to input, LIST and RUN a NEW programme, make alterations to that programme and then LIST and RUN the amended programme.

EXERCISE NO. 3

1. Enter this programme:

```
NEW
10 REM ALTERING A PROGRAMME
20 PRINT "EXERCISE NO. 3"
30 PRINT "**************"
40 PRINT
50 PRINT "YOUR NAME"
60 PRINT
70 A = 50
80 B = 10
90 C = 12
100 PRINT "A = ";A
110 PRINT "B = ";B
120 PRINT "C = ";C
130 PRINT
140 D = A + B + C    )   ALTERNATIVELY
150 PRINT "D = ";D   )   140 PRINT "D = "; A+B+C
160 PRINT
170 E = D - B        )   ALTERNATIVELY
180 PRINT "E = "; E  )   170 PRINT "E = "; D-B
9999 END

LIST

RUN
```

If you leave out an instruction, e.g. PRINT, and then try to RUN the programme, you will receive a SYNTAX ERROR message, identifying the statement by number. Check that statement number in your LISTed programme and make the necessary correction. Try this yourself, by deliberately leaving out the word PRINT in Statement 180.

Now make these alterations to your programme:

Insert Statement Number 55 PRINT "*** same number as letters and spaces in your name"
Change A to 100, B to 20 and C to 24.
Delete statements 160 to 180.

```
LIST

RUN
```

EXERCISE NO. 4

In a previous chapter, you worked out the cost of making some purchases. That same problem is repeated here, but written as a programme. See if you can understand the steps, then enter the programme.

```
NEW
10 REM TO DETERMINE COST
20 PRINT "EXERCISE NO. 4"
30 PRINT "**************"
40 PRINT
50 PRINT "YOUR NAME"
60 PRINT "********"
70 PRINT
80 REM N = NUMBER OF ARTICLES
90 REM P = PRICE OF EACH ARTICLE
100 REM C = TOTAL COST
110 N$ = "NUMBER"
120 P$ = "PRICE"
130 C$ = "COST"
140 N = 48
150 P = 17.58
160 C = N * P
170 PRINT N$, P$, C$
180 PRINT N, P, C
9999 END

LIST

RUN
```

EXERCISE NO. 5

Your programme (Exercise No. 4) is still stored in memory. Make the following changes to that programme.

```
Change to Exercise No. 5.
Delete Statements 30 and 60.
Insert a blank line after Statement No. 170.
Change N to 75
Change P to 25.99

LIST

RUN
```

EXERCISE NO. 6

Design a simple programme to solve this problem.

If you purchased 32 articles, and the total cost was
$497.60, what was the price of each article?

HINT - you should be able to adapt Exercise No. 5
to solve this problem.

LIST

RUN

EXERCISE NO. 7

Design a simple programme to find the area of a rectangle where
L = length, W = width and A = area.

Your programme should include statements, such as the following, to
print:

AREA OF RECTANGLE IS ___ sq.cm.

HINT - you may be able to modify your previous programme.

LIST

RUN

INVERSE, FLASH AND NORMAL

Your Exercise No. 7 is still stored in memory. Let's try something
different!

1. Clear the screen - remember - HOME.

2. Type INVERSE

3. Type LIST

Notice the difference in the visual appearance of the programme?

4. Type HOME

5. Type FLASH

6. Type LIST

What difference does this make to the visual appearance?

7. Type NORMAL to return to normal output.

— CHAPTER 8 —

Deferred Execution of Commands — Part 3
Read/Data; Go To; If/Then; For/Next

Now that you can understand very simple programmes, let's look at some other instructions available with the APPLE II PLUS.

READ and DATA STATEMENTS

In your previous programmes, you assigned a value to a numeric variable by:

A = 24   B = 76   etc.

and to a string variable by:

A$ = "NAME"   B$ = "COST"   etc.

Data can also be assigned to variables by using the READ and DATA statements.

1. Enter this programme:

```
NEW
10 REM USING READ AND DATA STATEMENTS
20 PRINT "EXERCISE NO. 8"
30 PRINT "**************"
40 PRINT
50 READ A,B,C
60 PRINT A,B,C
70 PRINT : PRINT
80 PRINT A,B,C
150 DATA 15, 32, 56
9999 END

LIST            RUN
```

What was the effect of Statement No. 70?   (Printed two blank lines.)

In RUNning this programme, the computer assigned the value of the first DATA item (15) to the first variable (A); the second DATA item (32) to the second variable (B); and the third DATA item (56) to the third variable (C).

2. Now:

Change Exercise 8 to Exercise 9.
Insert a statement to print your name.
Change Statement 70 so that one blank line will be printed.
Insert a statement to instruct that D = A + B + C.
Insert a statement to print that "A + B + C = ";D

```
LIST            RUN
```

3. Refer to the programme for Exercise No. 4 in Chapter 7.

Work out how to change that programme so that the values of
N and P are assigned by READ and DATA statements.

Enter your programme as Exercise No. 10.

Remember: NEW
            LIST
            RUN

THE GO TO STATEMENT

The GO TO statement instructs the computer to GO TO another statement
number. In the following programme, Statement 100 instructs the
computer to go back to Statement 70 and repeat the instructions.

The GO TO statement is called an UNCONDITIONAL statement because the
computer must obey.

1. Enter this programme:

```
NEW
10 REM USING THE GO TO STATEMENT
20 PRINT "EXERCISE NO. 11"
30 PRINT
40 READ A$, B$, C$
50 PRINT A$, B$, C$
60 PRINT
70 READ N, P
80 C = N * P
90 PRINT N, P, C
100 GO TO 70
110 DATA "VALUE A"     ) These items could be combined
120 DATA "VALUE B"     ) in one statement, e.g.
130 DATA "VALUE C"     ) DATA "VALUE A", "VALUE B", "VALUE C"
140 DATA 10, 20          ) These items could be combined
150 DATA 20, 40          ) in one statement, e.g.
160 DATA 40, 80          ) DATA 10, 20, 20, 40, 40, 80
9999 END

LIST

RUN
```

Notice the error message "OUT OF DATA ERROR IN 70". The computer
followed your instructions until all the data (Statements 140, 150,
and 160) had been used. Then – following your instruction in
Statement 100 – the computer went back to Statement 70, but could not
find any more data to read. The error message explains to you why the
computer could not follow your instructions any more.

2. Design a short programme, using the GO TO statement, to find the
    price of each article.

                14 articles   total cost $310.66
                27 articles   total cost $866.97
                21 articles   total cost $176.82

        Call your programme Exercise No. 12.

        Select your own column headings.

        Price will equal Cost divided by Number.

        Remember -   NEW   - unless you can adapt Exercise 11.
                     LIST
                     RUN

3. Here is another example of a GO TO statement. Remember - GO TO
    means that the computer must obey the command - it is an
    UNCONDITIONAL statement.

    In this programme, the GO TO statement will cause a never-ending
    loop, so it will be up to you to stop the RUN execution when you
    have seen how it works.

    TO STOP THE RUN EXECUTION, USE   CTRL-C (i.e. press the two
    keys CTRL and C together)

    Enter this programme:

        NEW
        10 REM GO TO AND CONTINUOUS LOOP
        20 PRINT "EXERCISE NO. 13"
        30 PRINT
        40 PRINT "YOUR NAME"
        50 PRINT
        60 READ L
        70 PRINT L
        80 L = L + 2
        90 GO TO 70
        100 DATA 2
        9999 END

    Look at this programme and try to work out why the GO TO statement
    will cause a never ending loop.

        LIST

        RUN   REMEMBER - stop the RUN with CTRL-C (together.)

                                                                        39

NOTES:

(a) When you stopped the programme RUN, you received a message BREAK IN (no.). This means that - when you depressed CTRL-C the RUN of the programme was stopped at Statement (no.).

(b) What does Statement 80 mean?

   L = L + 2 is actually an instruction to the computer -

   "Let the value of L be replaced by the value of L + 2."

(c) If you want to RUN the programme again,

        type   CONT   (for continue)

   but remember to use CTRL-C to stop the RUN.

IF-THEN STATEMENTS

The IF-THEN Statement is a CONDITIONAL Statement, because it instructs the computer:

IF (a certain condition is met) THEN (go to another statement).

Remember the continuous LOOP in Exercise 15? Now you are going to insert a condition that will end that LOOP.

1. Enter this programme:

```
NEW
10 REM IF-THEN STATEMENT
20 PRINT "EX NO. 14"
30 PRINT
40 PRINT "YOUR NAME"
50 PRINT
60 READ L
70 PRINT L
80 L=L+2
90 IF L>20 THEN 9999
100 GO TO 70
110 DATA 2
9999 END
```

The sign > means "greater than", so statement 90 instructs the computer:

   If L is greater than 20, then go to Statement 9999.

        LIST

        RUN

2. Amend Exercise 14 by:

Changing Statement 70 to PRINT L, (What effect will the comma
have?)
Changing Statement 80 to L=L-2
Changing Statement 90 to IF L < 0 then 9999
Changing Statement 110 to DATA 100

The sign < means "less than" so Statement 90 will now instruct:

IF L is less than 0, then go to Statement 9999.

LIST

RUN

3. Look carefully at this programme and try to understand it before
you enter it.

```
NEW
10 REM IF-THEN STATEMENT
60 REM P=PRICE
70 REM R=RATE
80 REM T=TAX
20 PRINT "EXERCISE 15"
30 PRINT
40 PRINT "YOUR NAME"
50 PRINT
90 PRINT TAB(10); "SALES TAX SCHEDULE"
100 PRINT
110 READ P$, R$, T$
120 PRINT P$, R$, T$
130 PRINT
140 READ P,R
150 T = P * R
160 PRINT P, R, T
170 P = P + 5
180 IF P = 105 THEN 9999
190 GO TO 150
200 DATA "PRICE"        ) These items could be combined
210 DATA "RATE %"       ) in one statement, e.g.
220 DATA "TAX"          ) DATA "PRICE", "RATE %","TAX"
230 DATA 5, .10
9999 END
```

Have you worked out how this programme will RUN?

Enter the programme.

LIST

RUN

4. Design a short programme (Exercise 16) to produce the following output. Use READ, DATA, GO TO, IF-THEN Statements.

SCHEDULE OF CASUAL RATES

Hours Worked	Hourly Rate	Wages Due
2	6.80	(Hours x Rate)
4	6.80	
6	6.80	
8	6.80	
10	6.80	
up to 40		

FOR-NEXT STATEMENTS

The number of times an instruction is performed can be controlled by FOR-NEXT Statements.

FOR sets the number of times (from 1 to ?) the programme will LOOP to perform an instruction.

NEXT increases that number until the maximum is reached, and the LOOP is stopped.

1. Study this programme

```
NEW
10 REM FOR-NEXT STATEMENT
20 PRINT "EXERCISE 17"
30 PRINT
40 PRINT "YOUR NAME"
50 PRINT
60 REM C=COUNTER FOR LOOP
70 READ A,B
80 FOR C=1 to 20 STEP 1
90 PRINT A,B
100 A=A+B
110 NEXT C
120 DATA 10,2
9999 END
```

Statement 80 (FOR C=1 to 20 STEP 1) is the starting point for the LOOP. The counter C will start at 1.

Statement 110 (NEXT C) is the instruction to go to Statement 80 and increase the counter by the STEP shown, (in this programme Step 1). So the counter becomes 2.

The programme LOOPS (works) from Statement 80 to Statement 110 until the counter = 20. The programme will then END.

Enter this programme

LIST

RUN

2.   Now make these changes:

Change to Exercise 18
Change the FOR Statement to Step 2.
Change A = A + B   to   A = A * B

LIST

RUN

3.   What do you think will happen when you RUN this programme?

```
NEW
10 REM SIXES AND SEVENS
20 PRINT "EXERCISE 19"
30 PRINT
40 PRINT "YOUR NAME"
50 PRINT
60 REM C=COUNTER
70 READ A,B
80 FOR C=200 TO 0 STEP -1
90 PRINT A;B;
100 NEXT C
110 DATA 6,7
9999 END
```

Enter this programme

LIST

RUN

4.   Design a simple programme (Exercise 20) using FOR-NEXT Statements, and some of the other commands you have learned.

Enter your programme

LIST

RUN

CTRL-C AND CONT

REMEMBER - if you want to stop the RUN of any programme:

    CTRL-C   to stop RUN   CONT   to continue RUN

CTRL-X

If you want to stop the LISTing of any programme:

    CTRL-X   to stop LIST   CTRL-X to continue LIST

USING THE PRINTER

BEFORE PROCEEDING CHECK THAT THE PRINTER HAS A SUPPLY OF PAPER
INSERTED. SEE THE MANUAL FOR YOUR PARTICULAR PRINTER FOR DETAILS OF
PAPER INSERTION.

The interface card for the Printer is normally in Slot 1. To deflect
output from the screen to the printer, you would type PR#1 (where # =
international symbol for number, and 1 = Slot number). If your
computer has the interface card in a different Slot, simply substitute
that Slot number.

1.   Turn printer ON.

2.   Type PR#1 (RETURN)   To deflect output from screen to printer.

The following commands will not display on the screen.

3.   Type CTRL-I80N (RETURN) To set printer to 80 spaces wide.

4.   Type   LIST (RETURN)   or   RUN (RETURN).

5.   When printing finished,

    Type PR#∅ (RETURN)   To deflect output back to screen.

6.   Turn printer off.

Re-enter the programme for Exercise 15 (page 41).

LIST and RUN on the screen.

LIST and RUN on the PRINTER.

Re-enter the programme for Exercise 16 (page 42)

LIST and RUN the programme on the PRINTER.

— CHAPTER 9 —
The Disk Drive and Diskettes

OMIT THIS CHAPTER IF YOU ARE USING ONLY A CASSETTE RECORDER AND
CASSETTES.

Using the disk drive and diskettes is a convenient and efficient
method to access a large amount of data and to provide secure storage
for your own programmes.

THE DISK DRIVE

The operation of the disk drive can be compared to that of a cassette
recorder.

Compare the following steps:

Cassette Recorder		Disk Drive
Insert cassette		Insert diskette
Close door	)	
	)	Close door
Depress Play button	)	
Head lowered on cassette		Head lowered towards diskette (but not actually touching)
Sound is produced		Contents are "read"

DISKETTES

Diskettes are used for storage and retrieval of information for future
reference. Information is filed under FILE NAME i.e. surname,
subject, etc.

Make-up

The diskette you will be using will probably be a "floppy" disk.
This means that the diskette is flexible – but bending will damage it.
The protective cover contains both lubricants and cleaning agents.
Always treat the diskette with respect.

The diskette is a small 12.5 cm plastic disk coated so that
information may be stored on and erased from its surface – the coating
is similar to that on a recording tape/cassette.

The diskette is sealed in a square plastic cover to protect it. The
cover helps to keep it clean and allows it to spin freely in the disk
drive. THE COVER IS NEVER OPENED.

Some diskettes have a reinforced section around the centre spindle hole. This helps to prevent excessive wear on the inner edge of the diskette.

There is a slot in the cover through which the "head" is able to READ the contents.

The diskette can store almost one million bits of information — therefore each individual bit occupies a very small portion only — so an invisible scratch or even a fingerprint can cause an error.

Care

Never let anything touch the brown/grey surface (especially fingers) — handle by plastic cover only.

Average Life

The average life of a diskette is 40 hours — considering the few seconds it takes to READ the information — the diskette should last a long time.

Storage

Keep the diskette in a paper jacket when not in use to minimize static electricity build-up which attracts dust.

It is preferable to store the diskette vertically.

Keep the diskette away from magnetic fields e.g. electric motors, magnets, etc. DO NOT PLACE ON TOP OF MACHINE.

Keep the diskette out of the sun and away from heat. The diskette can warp and the first evidence of heat damage is a warped or bent plastic cover.

Label

Always label diskettes so you will know the contents. Write title on a label and then attach to diskette. Do not write on a label already attached to diskette, as this could damage the diskette.

Write-Protecting

You will notice a small "cut-out" on the side of the cover — this is covered with a tab so the recorded contents of the diskette cannot be erased. This is very similar to a cassette where the two small lugs at the back are removed so that nothing can be recorded over and hence nothing can be erased. A diskette that you intend to work on should have this label removed, so that information can be recorded on and read from the diskette.

INSERTING A DISKETTE

1. Hold the diskette carefully in a horizontal position without
   touching the exposed sections. The label should be facing up.
   This means that the Write-Protect cut-out will be to the left
   as the disk is inserted. You will feel the diskette seat into
   place.

2. Turn the machine on by the power switch located at left rear of
   machine.

3. Close the drive door - this actually lowers the "head" towards
   the diskette so that it can "read" the contents. However, the
   head does not actually touch the diskette.

4. The red IN USE light on the Drive will light up while the motor
   is working. The data and/or instructions on the diskette will be
   transferred to RAM.

   DO NOT ATTEMPT TO USE THE MACHINE WHILE THIS RED LIGHT IS ON.

        i.e.   do not open the disk drive door
               do not use the keyboard

Courtesy of Electronic Concepts Pty Ltd

USING A DISKETTE

1. Insert SYSTEM MASTER DISK - DOS 3.3.

    This disk will put an additional language into the computer's
    memory and will also load the programmes recorded on the disk.
    This is sometimes referred to as BOOTING THE SYSTEM.
    (see page 53 for another method of Booting the System)

    Each time the computer is switched off you will have to BOOT the
    system when restarting.

    If using the DOS 3.2.1 System this process requires two separate
    disks. Firstly, insert the language disk - BASIC INTEGER AND
    APPLESOFT II Diskette which will BOOT the system. Then insert
    the SYSTEM MASTER DISK - DOS 3.2.1 - PLUS to load the programmes.

2. Turn machine ON.

3. Close disk drive door.

4. Red IN USE light on Disk Drive will light up while the 'head' is
    reading.

    (If using DOS 3.2.1 - remove the language disk and insert second
    disk in Drive 1. Press RETURN and close drive door.)

5. The symbols] > indicate that it is reading the programme from
    the diskette and is storing it in memory.

6. Wait until the red IN USE light goes off.

7. To see what programmes are on the diskette - type CATALOG
    immediately after the CURSOR - press RETURN - this is an
    instruction to the computer that you wish to see a listing
    of the programmes - similar to an index in a book.

    IMPORTANT - NOTE: Americanised spelling of CATALOG.

8. A list of FILE NAMES will appear on the screen - this is often
    referred to as a DIRECTORY.

9. Press SPACE BAR to see if there are further programmes in the
    DIRECTORY which did not initially show on the screen.

10. To list programmes, type LOAD PROGRAMME NAME. Wait until the
    red in use light goes off. Then type LIST.

11. To run programmes - type RUN followed by PROGRAMME NAME.

12. Call up COLOR DEMOSOFT - type RUN COLOR DEMOSOFT - press RETURN -
    be careful to copy exactly the spelling and spacing.

    An INNER MENU will appear on the screen - this is a MENU that
    relates to this particular programme only.

Choose each number in turn - following the instructions on the screen - and the various graphics will be displayed. When making a selection always use the number.

12. Press RETURN to stop demonstration and to return to the INNER MENU.

13. Press RESET (or CTRL-RESET) - this will produce a cursor - type CATALOG to return to DIRECTORY.

PHONE LIST

This programme will allow you to follow a set of instructions and will show you how information which you enter, is stored and can be retrieved when desired - on the screen or on the PRINTER.

1. Select PHONE LIST - type RUN PHONELIST (leaving no space between the words). What did you notice?

   FILE NOT FOUND - because the programme name was not typed exactly as shown on the Directory the computer could not locate it.

2. Type RUN PHONE LIST.

3. INNER MENU, as shown below, will appear on screen.

   1. Search for a Listing.
   2. List Entire file.
   3. Enter new listings.
   4. Delete a listing
   5. Edit a listing
   6. Printer ON/OFF
   7. Exit this programme

Enter New Listing

4. Select number 3.

5. Enter name: JACKSON HARRY
   Press RETURN

6. Enter number: be sure to copy format displayed
   075 208 9432
   Press RETURN

7. Screen will display total entry and will ask if entry is correct Y/N - if correct - type Y and RETURN

8. Computer will return to INNER MENU.

9. ENTER these 5 names to the Phonelist:

    DR KING KEVIN   032 124 8735
    SMITH BRIAN   071 341 6825
    JACKSON SHERYL   062 731 8240
    JACKSON COLIN   049 356 7842
    DR BATT ROBERT   052 246 8024

List Entire File

10. Select number 2.

11. All names and phone numbers will appear on the screen.

12. Return to INNER MENU.

Search for Listing

13. Select number 1.

14. When searching for a file the computer can search by word or by character.

15. Select 'word'.

16. ENTER SEARCH KEY will appear on the screen. The computer will SEARCH for all entries beginning with this particular letter.

17. Type 'J' - it will locate all entries where the first letter is 'J'.

18. Repeat Step 13.

19. Select 'character'.

20. Enter SEARCH KEY - DR - the computer will now search (character by character) for all entries where the first two characters are 'DR'.

    (Listing for DR BATT and DR KING will appear on the screen)

Delete a Listing

21. Type entry SMITH BRIAN

22. Entry will be shown on screen. You will be asked to decide if you wish to delete Y/N? Select yes.

23. LIST the entire file to check entry has been deleted.

<u>Edit</u> - used to make a change to an entry.

Change the phone number for JACKSON COLIN to 049 243 4917

24. As name is not changed simply retype.

25. Insert new phone number

26. Return to INNER MENU.

27. List the entire file to see changes.

Printer On/Off

28. Select number 6. Select printer ON.

29. Prepare a printed list of the entire file.

BEFORE PROCEEDING CHECK THAT THE PRINTER HAS A SUPPLY OF PAPER
INSERTED. SEE THE MANUAL FOR YOUR PARTICULAR PRINTER FOR DETAILS OF
PAPER INSERTION.

30. Turn printer on. When printing is completed turn printer off.

Exit this Programme

If nothing is recorded on diskette press RESET (or CTRL-RESET).

31. Return to Directory - type CATALOG.

USE OF PADDLES

If you have the paddles attached to the computer and wish to try
these, select the programme LITTLE BRICK OUT which requires the use of
paddles to participate in the programme.

CHOOSE ANY OF THE OTHER PROGRAMMES

If you wish to see any of the other programmes listed in the DIRECTORY
simply type RUN followed by PROGRAMME NAME.

If using the DOS 3.2.1. System you may use the SYSTEM MASTER DISK DOS
3.2.1 STANDARD.

Remember if you turn the computer off you must BOOT the system before
inserting this disk.

If using the SUPERMATH programme, when typing answers to addition,
subtraction and multiplication, the computer records units first, then
tens, hundreds etc.

INITIALISING A DISKETTE

A totally blank disk is of no use to your APPLE II PLUS. It needs to be set out magnetically in much the same way as you might draw lines on a blank page before you start to write.

So, the term INITIALISING A DISKETTE simply means preparing a diskette ready for use.

Method

1. Load SYSTEM MASTER DISK 3.3. (If using the DOS 3.2.1 System, insert the language disk and then the System Master Disk Plus)

2. Insert BLANK disk in Drive 1, close door, press RETURN.

3. Type NEW and then press RETURN.

4. Type 10 PRINT "HELLO", and then press RETURN.

5. Type INIT HELLO and press RETURN.

Initialising will start immediately and once the process is complete and the red IN USE light goes off, the diskette is ready for use.

PLEASE INITIALISE A BLANK DISK.

SAVING INFORMATION ON TO A DISKETTE

At this point, you will learn how to save one of your simple programmes on diskette for future reference. If the machine has been switched off, remember to BOOT the System.

1. Insert the blank disk which you have just initialised.

2. Type NEW

3. Enter a simple programme, one of your previous exercises.

4. LIST and RUN the programme.

5. Type SAVE (PROGRAMME NAME) - i.e. SAVE EXERCISE 14
    The data and/or instructions in your Exercise will be
    copied from RAM to the diskette.

Once you have SAVEd the programme, type CATALOG followed by RETURN to see the name of the programme listed on the diskette.

You would then be able to recall EXERCISE 14 from the diskette at any later time by:

    (a)   LOAD EXERCISE 14   and then   LIST

    (b)   RUN EXERCISE 14

ANOTHER METHOD OF BOOTING THE SYSTEM

If you have been using the computer without engaging the disk drive, it is possible to BOOT THE SYSTEM without turning the computer off. Whatever you had in memory will be lost.

1. Insert initialised disk in Drive 1.

2. Type PR#6. (This will boot the system.)

3. Wait until the red in-use light goes off.

4. Enter a programme.

5. Now type SAVE PROGRAMME NAME.

6. Check CATALOG.

7. You could now LIST or RUN that programme at any later time.

DELETING PROGRAMME FROM DISKETTE

Call up CATALOG.

Type DELETE followed by PROGRAMME NAME - press RETURN - programme is automatically deleted.

MAKING A COPY OF AN ENTIRE DISKETTE

Obtain a blank diskette and a diskette containing some of your own programmes. When making a copy you do not need to initialise the blank diskette.

Call up the programme COPY from the SYSTEM MASTER DISK DOS 3.3 (System Master Disk DOS 3.2.1 PLUS)

Do you remember how to get this information on to the screen?

Let's try it.

Follow Instructions carefully

Insert ORIGINAL disk in drive 1

Press RETURN

Insert COPY disk into DRIVE 2

Press RETURN

COPY IS BEING MADE

Computer will ask - DO YOU WISH TO MAKE ANOTHER COPY - if the answer is NO you have finished the process.

COPYING A PROGRAMME FROM ONE DISK TO ANOTHER DISK

1. Insert disk containing programme to be copied.

2. Type   LOAD   PROGRAMME NAME

3. Remove disk.

4. Insert disk on which programme is to be copied.

5. Type   SAVE   PROGRAMME NAME.

RENAMING A PROGRAMME ON DISKETTE

There may be a reason for you to RENAME a programme which has been saved.

1. Insert selected disk in Drive 1.

2. Call up CATALOG.

3. Select name of the programme you wish to rename.

4. Type RENAME OLDNAME, NEWNAME

PRINTING A PROGRAMME FROM DISKETTE

1. Insert selected diskette in Drive 1.

2. Call up CATALOG.

3. Select name of programme to be printed.

4. If you want to print a listing of your programme:

   Type   LOAD PROGRAMME NAME

5. CHECK THAT THE PRINTER HAS A SUPPLY OF PAPER.

6. Turn printer on.

7. Type PR#1   (to deflect output from screen to printer)

8. Type LIST   to   obtain listing of programme

   or   RUN   to obtain the results of the programme.

9. When printing finished:

   Type PR#Ø   (to deflect output back to screen).

10. Turn printer off.

— CHAPTER 10 —
Cassette Recorder and Cassettes

OMIT THIS CHAPTER IF YOU ARE USING ONLY A DISK DRIVE AND DISKETTES.

STARTING THE SYTEM

1. Turn machine ON. Call prompt and cursor.

2. Clear screen. (HOME or ESC, @ (Shift-P)

3. Insert cassette (use COLOR DEMOSOFT) into cassette recorder.

4. Rewind tape to beginning.

5. Set volume.

6. Depress Play button.

LOADING THE CASSETTE

1. Type LOAD and RETURN. Cursor will disappear.

3. One of the following will happen:-

    (a) SYNTAX ERROR

                                       Stop cassette
                                       Rewind cassette to beginning
                                       Increase volume
                                       Depress Play button
                                       Type HOME
                                       Type LOAD and RETURN

    (b) ERROR MESSAGE or   Depress RESET
          NOTHING   Follow instructions in (a)

    (c) COMPUTER WILL BEEP: Either an ERROR MESSAGE will appear –
                                       follow instructions in (b)
                        or   Prompt and cursor will appear, to
                                       indicate that contents of tape are
                                       loaded into computer memory (RAM).

4. Mark the volume setting on the cassette recorder for future use.

5. Stop cassette recorder.

6. Rewind tape to beginning and remove cassette.

RUNNING THE PROGRAMME

Now that the contents of the tape are safely stored in the computer memory:

1.   Type RUN   (and RETURN)

2.   MENU (list of contents) is displayed.

3.   Follow instructions on screen.

4.   Depress RETURN to stop demonstration and return to MENU.

You can then use any other pre-recorded cassette in the same way.
Some of the pre-recorded programmes available are Color Demosoft,
Phone List, Brian's Theme, Lemonade, Penny Arcade, and Little Brick
Out (you would have to use the paddles for this last one).
Refer to Chapter 9 for methods of using some of these programmes.

SAVING PROGRAMMES ON CASSETTE

When you have entered a programme into computer memory, and have
trialled that programme, you may wish to SAVE it on cassette.

1.   Put blank cassette tape in cassette recorder.

2.   Rewind tape to beginning, then advance leader tape and set
     counter to 0.

3.   Depress RECORD and PLAY buttons. Immediately type SAVE.

5.   Computer will BEEP to signal start of recording, and will BEEP
     again to signal end of recording. Remember - you may need to
     adjust the volume.

6.   Depress STOP button on recorder after second BEEP.

7.   Make a note of counter number.

8.   Type NEW and LIST to check that programme is gone from computer
     memory. You can then LIST and RUN in the usual way.

9.   Follow instructions for LOADING the CASSETTE to make sure that
     the programme has been saved.

10. Keep a record of programmes saved on each cassette, with counter
     starting and finishing numbers.

11. Provided you keep a record as suggested above, you can SAVE
     further programmes on the cassette by commencing the next SAVE
     just after the counter number which indicated the finish of the
     previous programme.

— CHAPTER 11 —
Graphics

Graphics allow you to draw shapes on the screen with dots of light.

TO CHANGE TO GRAPHICS

GR

This tells the computer that you will be using most of the screen to draw a shape.

The screen will then go black except for four lines at the bottom of the screen which will allow you to see the text you are typing. This lower area is called a TEXT WINDOW.

The top of the screen (the graphic screen) is divided into a grid with 40 columns across and 40 rows down.
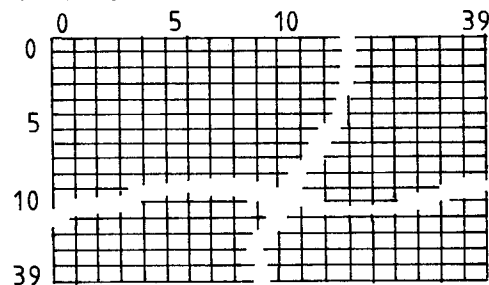
Each block is numbered starting from
    0 to 39 across
    0 to 39 down

Each point is actually a small rectangle.

If you plot a point outside these numbers you will get an error message: ILLEGAL QUANTITY ERROR

TO IDENTIFY THE LOCATION OF A POINT

When listing the location of a point always list the columns ACROSS and then the rows DOWN.

(Part of graphic screen only is listed below – this grid does not actually appear on the screen)

(column 7 across
 row 0 down)

(column 10 across
 row 2 down)

(4, 6)
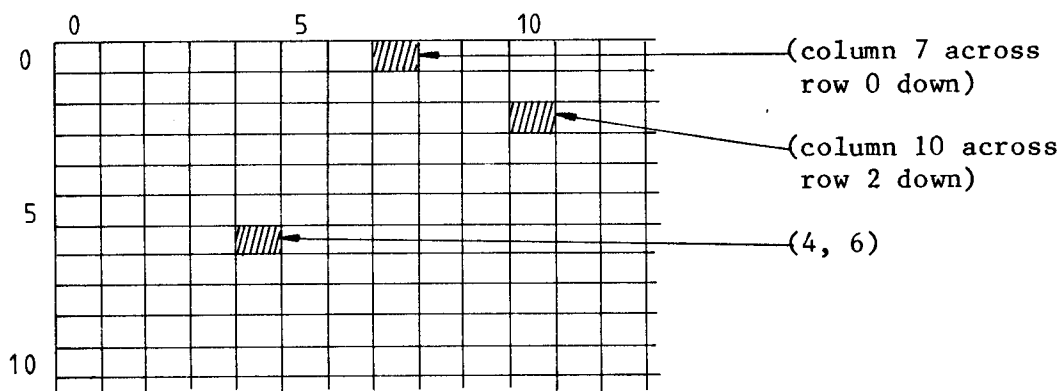
COLOURS AVAILABLE

The Apple II has colour graphics. There is a choice of 16 colours.
Each colour has its own number:

0	Black	6	Medium Blue	12	Green
1	Magenta	7	Light Blue	13	Yellow
2	Dark Blue	8	Brown	14	Aqua
3	Purple	9	Orange	15	White
4	Dark Green	10	Grey (different from 5)		
5	Grey	11	Pink		

If you do not specify a different colour the computer will
automatically choose black i.e. 0. So, when you plot a point on the
screen, nothing will appear as you have plotted a black point on a
black background.

To choose a colour

COLOR=12   (note the spelling of COLOR)

This will set the colour to 'green'.

If you have a black and white television monitor or set you can still
select a colour and the drawing will appear in shades of white to
black (i.e. grey).

IMMEDIATE EXECUTION OF COMMANDS

TO SET UP GRAPHICS

1. Turn machine on.

2. Press RESET (or CONTROL/RESET) and prompt and cursor will appear.

3. Type GR and press RETURN. (Notice that cursor has moved to bottom
                                part of the screen)

4. Type COLOR=12 and press RETURN. (Colour selected is green)

TO PLOT A POINT

5. Type PLOT 5,9 and press RETURN. (Be sure to type the comma
                                between the two numbers.)

    This point will light up on the screen.   (column 5 across
                                                row 9 down)

6. Plot another point - type PLOT 10,14.

7. Change the colour. Type COLOR=3 (i.e. purple)

8. Plot a point at column 15, row 20.

9. Plot 40,40 - note error message - blocks are numbered 0 to 39
    across and 0 to 39 down.

TO CANCEL A PLOTTED POINT

If a point is in the wrong position follow these steps:

1. Set colour to BLACK   (i.e. COLOR=0).

2. Re-enter <u>exactly</u> the incorrect plot.

    Try this - cancel your last plot.

    CHECK: COLOR=∅
              PLOT 15,20
3. Now re-set the colour to the required number.

DRAWING HORIZONTAL LINES

To light up a line <u>across</u> the screen:

HLIN 2,20 at 3

This statement tells the computer to:

(i) draw a line across the screen starting at column 2 and finishing
     at column 20.

(ii) the line should be on row 3 (i.e. 4 rows from the top of screen.)

<u>Remember</u>: This line is really a series of plotted points.

Enter the above statement.

Change the colour on the screen.

Enter two more horizontal lines.   (Remember: 0 to 39 across
                                             0 to 39 down)

Cancel the first line i.e. COLOR=∅
                           HLIN 2,20 at 3

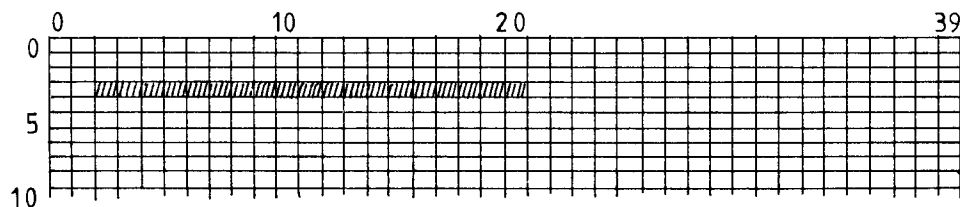<u>Remember</u>: Re-set colour after deletion.

DRAWING VERTICAL LINES

To light up a line <u>down</u> the screen:

VLIN 3,6 at 10

This statement tells the computer:

(i)   draw a line down the screen starting at row 3 and finishing at row 6.

(ii) the line should be at column 10 across the screen.

<u>Remember</u>: This line is really a series of plotted points.

Enter the above statement.

Change the colour on the screen.

Enter two more vertical lines.

Cancel the first vertical line i.e. COLOR=∅
                                         VLIN 3,6 at 10

Remember: Re-set the colour after deletion.

TO RETURN TO FULL SCREEN TEXT

When using graphics you have only the TEXT WINDOW for display of instructions. If you wish to return to text on the full screen:

Type TEXT and press RETURN – this changes the display from graphics to characters.

Because text and graphics both use the same area of memory you will now see a screen full of 'at' signs (@).

To clear screen – type HOME.

<u>SUMMARY</u>

1. GR   - clears screen for graphics
            - sets up 'text window' - i.e. 4 lines at bottom of screen
            - sets colour at $\emptyset$ - i.e. black

2. COLOR=10   - sets colour from 0 to 15

3. (i)   PLOT 5,10   - plots one point
    (ii)   HLIN 5,10 at 6   - plots horizontal line
    (iii) VLIN 3,20 at 10   - plots vertical line

4. TEXT   - changes from graphics to text.

5. HOME   - clears screen. Try to plot the following numbers and
letters:
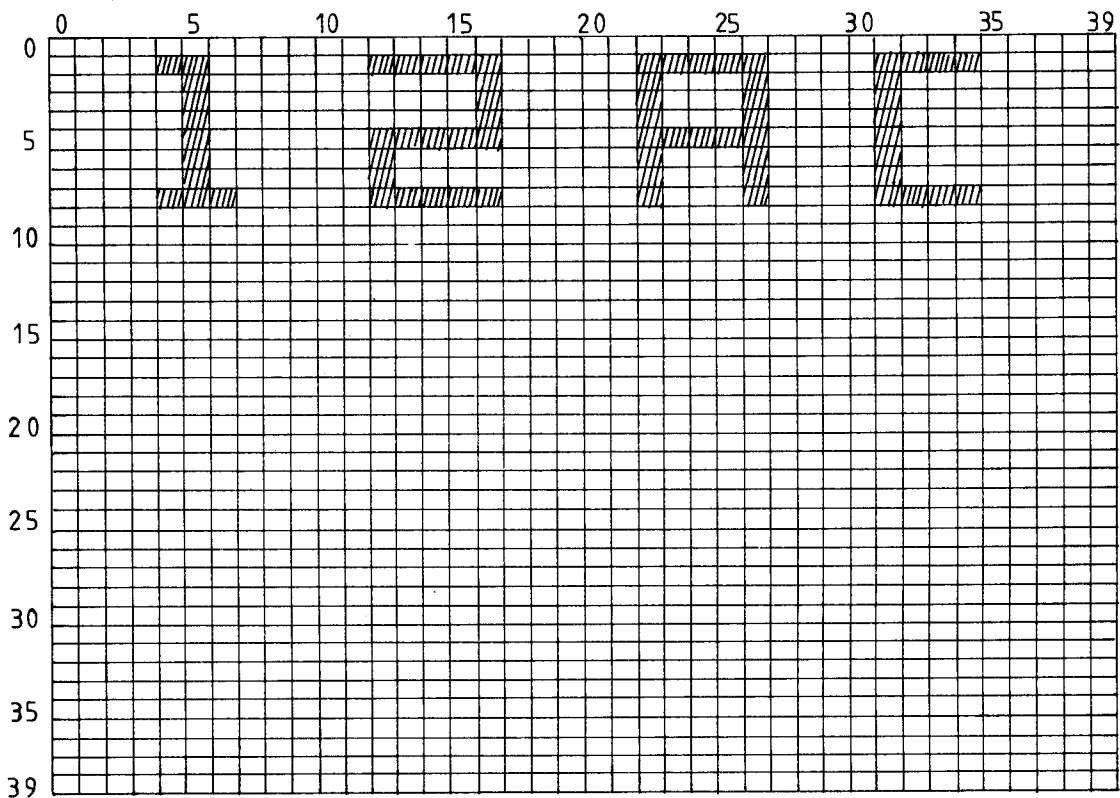
In the space at the bottom of the above grid draw in your name and
then plot your name on the screen.

DEFERRED EXECUTION OF COMMANDS

By inserting a number beside each statement the computer can store the commands so that you can LIST and RUN the programme and then, if desired you can SAVE them on to Diskette. Now you have created a BASIC programme to draw the shape.

Input the following programme exactly as shown:

```
NEW
10  GR
20  COLOR=13
30  HLIN 2,6 at 21
40  HLIN 10,14 at 21
50  HLIN 18,22 at 21
60  HLIN 33,36 at 21
70  HLIN 3,5 at 25
80  HLIN 11,13 at 25
90  HLIN 19,21 at 25
100 HLIN 34,36 at 25
110 HLIN 27,29 at 28
120 HLIN 34,36 at 28
130 VLIN 22,28 at 2
140 VLIN 22,28 at 6
150 VLIN 22,28 at 10
160 VLIN 22,25 at 14
170 VLIN 22,28 at 18
180 VLIN 22,25 at 22
190 VLIN 21,28 at 26
200 VLIN 22,28 at 33
999 END

LIST
RUN
```

If you wish to LIST programme again type TEXT then LIST

TO MAKE YOUR GRAPHICS FLASH

Add the following statement to your previous programme:

210 GOTO 10

Now LIST and then RUN the programme again.

Remember: To stop continuous loop – CTRL C
           To continue programme   – Type CONT

The word appears to be blinking – do you know why?

We have instructed the computer to go back to Statement 10 which was GR. This statement automatically makes the colour equal to $\emptyset$ (i.e. black) which means that your words have disappeared.

1. Use graph paper to draft your picture.
2. Write your programme from the graph paper.
3. Enter the programme. LIST, RUN.
4. To LIST the programme again, type TEXT for full screen display.

MYSTERY PROGRAMMES Enter the following programmes:

MYSTERY NO. 1   MYSTERY NO. 2

```
NEW                              NEW
10  GR                           5   GR
20  COLOR=2                      8   COLOR=12
30  HLIN 17,29 at 36             10  PLOT 24,2
40  HLIN 16,30 at 35             20  PLOT 23,3
50  HLIN 15,31 at 34             30  HLIN 22,23 at 4
60  HLIN 14, 31 at 33            40  HLIN 21,22 at 5
70  HLIN 9,13 at 34              50  HLIN 20,21 at 6
80  VLIN 29,33 at 8              60  HLIN 20,21 at 7
90  HLIN 9, 10 at 28            70  VLIN 8,11 at 19
100 PLOT 11,29                   80  VLIN 8,11 at 20
110 PLOT 12,30                   90  HLIN 12,15 at 10
120 PLOT 13,31                   100 HLIN 24,27 at 10
130 PLOT 14,32                   110 HLIN 11,16 at 11
140 COLOR=15                     120 HLIN 23,28 at 11
150 VLIN 18,32 at 25             125 COLOR=13
160 VLIN 18,32 at 24             130 HLIN 10,29 at 12
170 VLIN 18,32 at 23             140 HLIN 10,29 at 13
180 VLIN 18,32 at 22             150 HLIN 9,30 at 14
190 VLIN 18, 32 at 21            160 HLIN 9,30 at 15
200 HLIN 21,25 at 17             165 COLOR=9
210 HLIN 21,24 at 16             170 HLIN 9,30 at 16
220 HLIN 21,23 at 15             180 HLIN 8,30 at 17
230 HLIN 21,22 at 14             190 HLIN 8,29 at 18
240 PLOT 21,13                   200 HLIN 8,29 at 19
250 COLOR=9                      210 HLIN 8,28 at 20
260 VLIN 11,12 at 23             215 COLOR=11
270 HLIN 23,24 at 10         220 HLIN 8,28 at 21 )  ALTERNATIVELY:
280 HLIN 23,23 at 9          230 HLIN 8,28 at 22 )  220 FOR I=21 to 25
290 HLIN 23,24 at 8          240 HLIN 8,28 at 23 )  230 HLIN 8,28 at I
300 HLIN 22,24 at 7          250 HLIN 8,28 at 24 )  240 NEXT I
310 HLIN 22,24 at 6          260 HLIN 8,28 at 25 )
320 HLIN 22,23 at 5              265 COLOR=3
330 VLIN 2,4 at 23               270 HLIN 8,29 at 26
999 END                          280 HLIN 8,29 at 27
                                 290 HLIN 8,30 at 28
                                 300 HLIN 8,30 at 29
                                 310 HLIN 9,29 at 30
                                 320 HLIN 9,29 at 31
                                 325 COLOR=6
                                 330 HLIN 10,29 at 32
                                 340 HLIN 10,28 at 33
                                 350 HLIN 11,27 at 34
                                 360 HLIN 12,27 at 35
                                 370 HLIN 14,25 at 36
                                 380 HLIN 16,18 at 37
                                 390 HLIN 21,23 at 37
                                 999 END
```

MYSTERY NO. 3

Alter Mystery No. 2 as shown:

```
190 HLIN 8,31 AT 18
200 HLIN 8,31 AT 19
210 HLIN 8,31 AT 20
220 HLIN 8,31 AT 21
230 HLIN 8,31 AT 22
240 HLIN 8,31 AT 23
250 HLIN 8,31 AT 24
260 HLIN 8,31 AT 25
270 HLIN 8,31 AT 26
280 HLIN 8,31 AT 27
400 FOR L = 1 TO 900:NEXT L
410 COLOR = 0
420 VLIN 17,28 AT 31
430 FOR L = 1 TO 900:NEXT L
440 VLIN 18,27 AT 30
450 FOR L = 1 TO 900:NEXT L
460 VLIN 19,26 AT 29
470 FOR L = 1 TO 900:NEXT L
480 VLIN 21,24 AT 28
```

MYSTERY NO. 4

```
NEW
10 GR
20 COLOR = 12
30 PLOT 19,1
40 HLIN 18,20 AT 2
50 HLIN 18,20 AT 3
60 HLIN 17,21 AT 4
70 HLIN 17,21 AT 5
80 HLIN 16,22 AT 6
90 HLIN 16,22 AT 7
100 HLIN 15,23 AT 8
110 HLIN 15,23 AT 9
120 HLIN 14,24 AT 10
130 HLIN 14,24 AT 11
140 HLIN 13,25 AT 12
150 HLIN 13,25 AT 13
160 HLIN 12,26 AT 14
170 HLIN 12,26 AT 15
180 HLIN 11,27 AT 16
190 HLIN 11,27 AT 17
200 HLIN 10,28 AT 18
210 HLIN 10,28 AT 19
220 HLIN 9,29 AT 20
230 HLIN 9,29 AT 21
240 HLIN 8,30 AT 22
250 HLIN 8,30 AT 23
260 HLIN 7,31 AT 24
270 HLIN 7,31 AT 25
```

MYSTERY NO. 4 (Contd)

```
280 HLIN 6,32 AT 26
290 HLIN 6,32 AT 27
300 HLIN 5,33 AT 28
310 HLIN 5,33 AT 29
320 COLOR = 8
330 VLIN 30,34 AT 18
340 VLIN 30,34 AT 19
350 VLIN 30,34 AT 20
360 COLOR = 6
370 FOR X = 35 TO 39 STEP 1
380 HLIN 16,22 AT X
390 NEXT X
400 FOR X = 1 TO 200
410 COLOR = 15
420 PLOT 19,8
430 PLOT 23,11
440 PLOT 22,22
450 PLOT 9,27
460 COLOR = 13
470 PLOT 12,21
480 PLOT 15,24
490 PLOT 28,25
500 COLOR = 9
510 PLOT 19,3
520 PLOT 22,17
530 PLOT 15,15
540 COLOR = 11
550 PLOT 25,28
560 PLOT 27,19
570 PLOT 18,12
580 COLOR = 7
590 PLOT 19,26
600 PLOT 30,28
610 PLOT 13,28
620 COLOR = 0
630 PLOT 19,8
640 PLOT 23,11
650 PLOT 22,22
660 PLOT 9,27
670 PLOT 12,21
680 PLOT 15,24
690 PLOT 28,25
700 PLOT 19,3
710 PLOT 22,17
720 PLOT 15,15
730 PLOT 25,28
740 PLOT 27,19
750 PLOT 18,12
760 PLOT 19,26
770 PLOT 30,28
780 PLOT 13,28
790 NEXT X
999 END
```

— CHAPTER 12 —
How to Prepare the Programme

So far, the programmes you have used have all been very simple. If you plan to develop your own programmes, you will need to learn how to solve the problem and then transfer this information into your programme.

To solve any problem, you should first divide it into smaller sections to make the solution easier.

Steps to follow:

1. Consider the problem carefully.
2. Select the layout you require for your answer.
3. Identify the data you have been given.
4. Assign variables as required.
5. Decide what calculations will be needed.
6. Decide what decisions need to be made.
7. Prepare guidelines.
8. Write programme.

1. Now, put these steps into action with a simple exercise.

   The question for that exercise could have stated:-

   Write a programme which will print:

   EXERCISE NO. 3

   YOUR NAME

   A = 50
   B = 10
   C = 12

   D = (A + B + C)

   E = (D - B)

STEP 1

Consider problem   Read question carefully

STEP 2

Select layout   Already available

STEP 3

Identify given data   A = 50
                                 B = 10
                                 C = 12

STEP 4

Assign variables   All variables given

STEP 5

What calculations?   D = (A + B + C)
                                 E = (D - B)

STEP 6

What decisions?   None in this example

STEP 7

Prepare guidelines   Use a Flowchart   OR
                                 List as a series of short sentences.
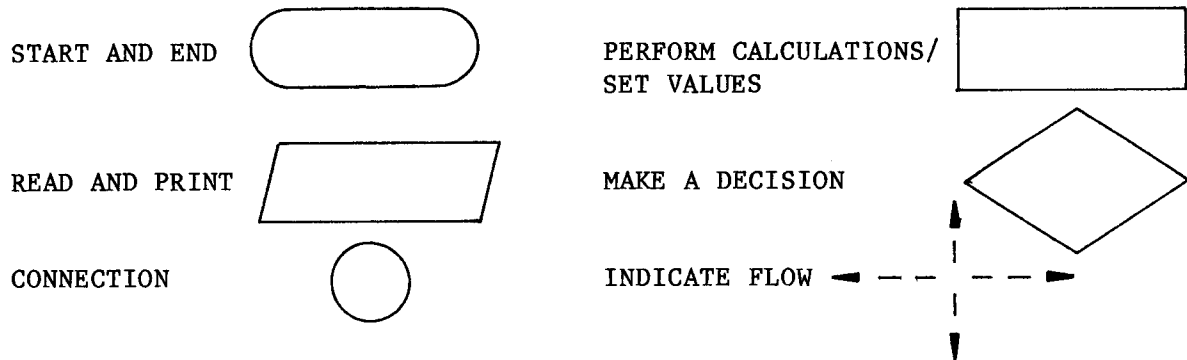
STEP 8

Write programme   From your guidelines

GUIDELINES
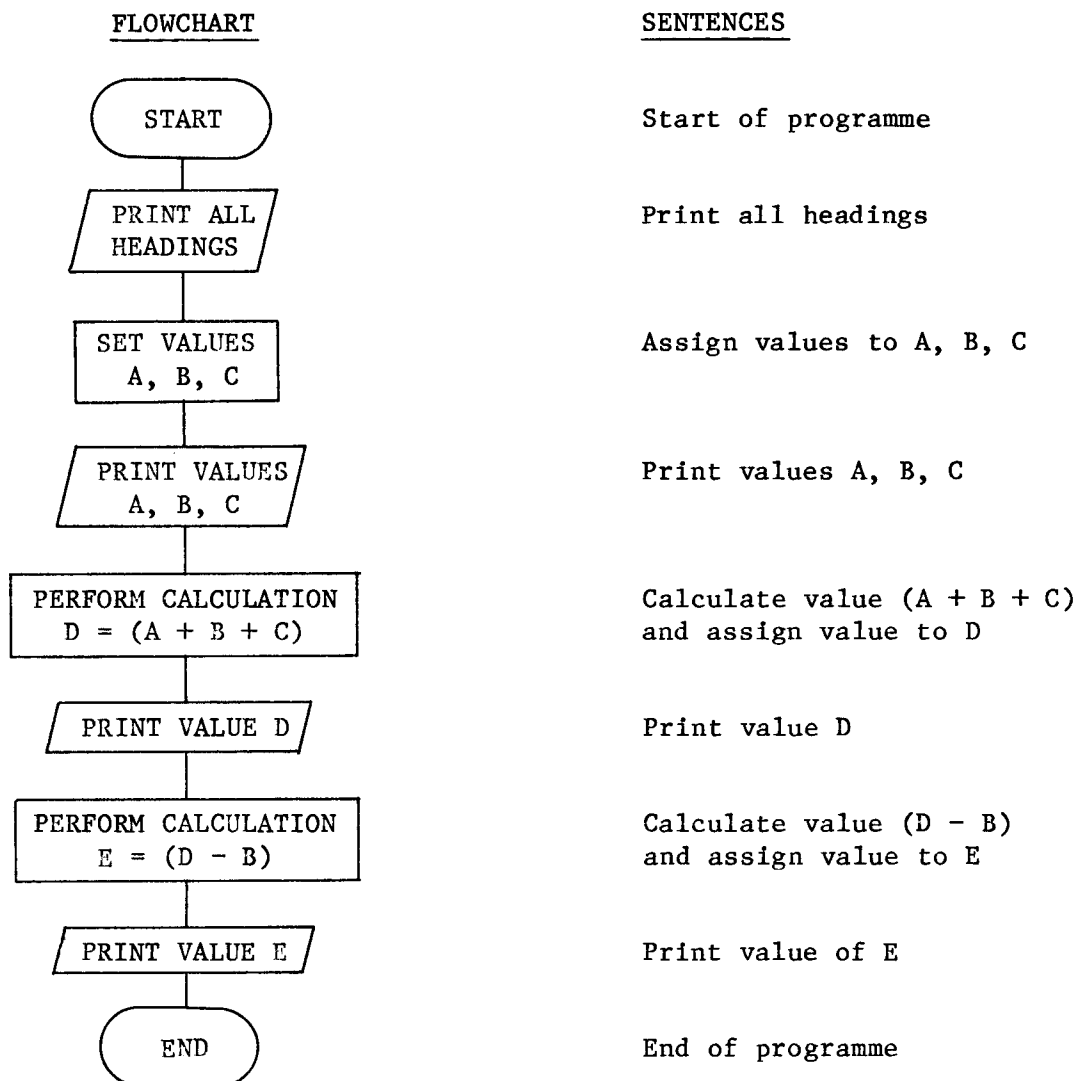
In preparing guidelines, you may use either:

(a) a flowchart   - a diagram of the logical steps needed, or

(b) short sentences   - to outline each step

For the exercises in this chapter, use both methods and then decide
which approach you prefer.

When using a flowchart, the following shapes are often used to represent different steps.

START AND END

PERFORM CALCULATIONS/
SET VALUES

READ AND PRINT

MAKE A DECISION

CONNECTION

INDICATE FLOW

Your guidelines for Exercise 3 could be:

FLOWCHART	SENTENCES
START	Start of programme
PRINT ALL HEADINGS	Print all headings
SET VALUES A, B, C	Assign values to A, B, C
PRINT VALUES A, B, C	Print values A, B, C
PERFORM CALCULATION D = (A + B + C)	Calculate value (A + B + C) and assign value to D
PRINT VALUE D	Print value D
PERFORM CALCULATION E = (D - B)	Calculate value (D - B) and assign value to E
PRINT VALUE E	Print value of E
END	End of programme

Note: REM statements are not shown in either flowchart or sentences. REMark statements are used to identify and clarify your programme.

2. By following the examples, you should now be able to write guidelines for Exercise 4 (page 35) from this question.
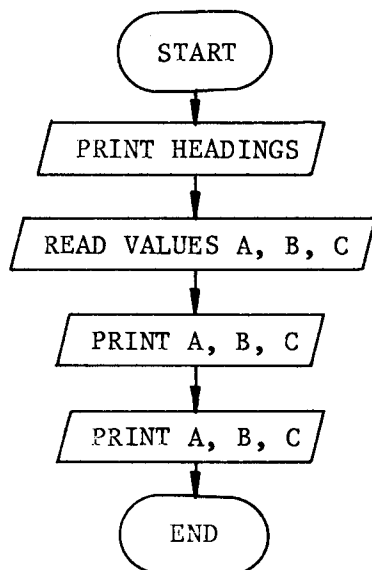
Write a programme which will print:

EXERCISE NO. 4

YOUR NAME

NUMBER	PRICE	COST
48	17.58	(Number x Cost)

3. Now prepare guidelines for Exercises 5, 6 and 7 (from pages 35-36)

4. Here are the guidelines for Exercise 8 (page 37)

FLOWCHART   SENTENCES

```
      ( START )                        Start programme

  / PRINT HEADINGS /                   Print headings

 / READ VALUES A, B, C /               Read data for A, B, C

   / PRINT A, B, C /                   Print values A, B, C twice

   / PRINT A, B, C /

      ( END )                          End of programme
```

Note: Data statements are not actually shown on the flowchart.

5. Prepare guidelines for Exercise 10 (page 38).

6. This question refers to Exercise 14 (page 40).

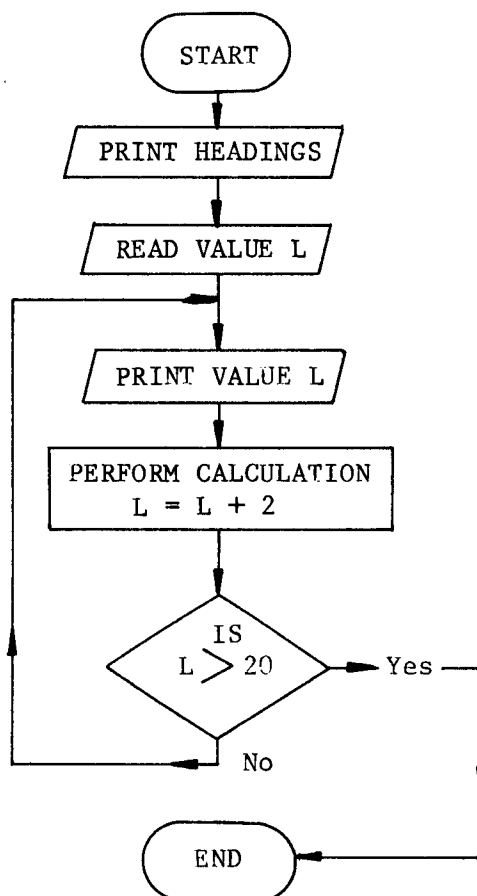Write a programme which will print:

EXERCISE NO. 14

YOUR NAME

2
4
6

up to
20

These are the guidelines:

FLOWCHART   SENTENCES

```
        ┌─────────┐
       (  START   )                    Start programme
        └────┬────┘
             ▼
      / PRINT HEADINGS /                Print headings
             │
             ▼
      / READ VALUE L /                  Read data for L
             │
             ▼
      / PRINT VALUE L /                 Print value of L
             │
             ▼
    ┌─────────────────┐
    │ PERFORM CALCULATION │             Increase L by 2
    │   L = L + 2     │
    └─────────────────┘
             │
             ▼
          ◇ IS
         L > 20  ──► Yes ─┐             Is L greater than 20?
             │                              If NO - print L
            No                                    - increase L by 2
             │                              If YES - end of programme
        ┌─────────┐
       (  END     )◄───────┘
        └─────────┘
```

Note: This programme will LOOP until the value of L is greater than
        20.

7. Prepare guidelines for Exercise 15 (page 41) and
   Exercise 16 (page 42).

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8. The question for Exercise 17 (page 42) could state:

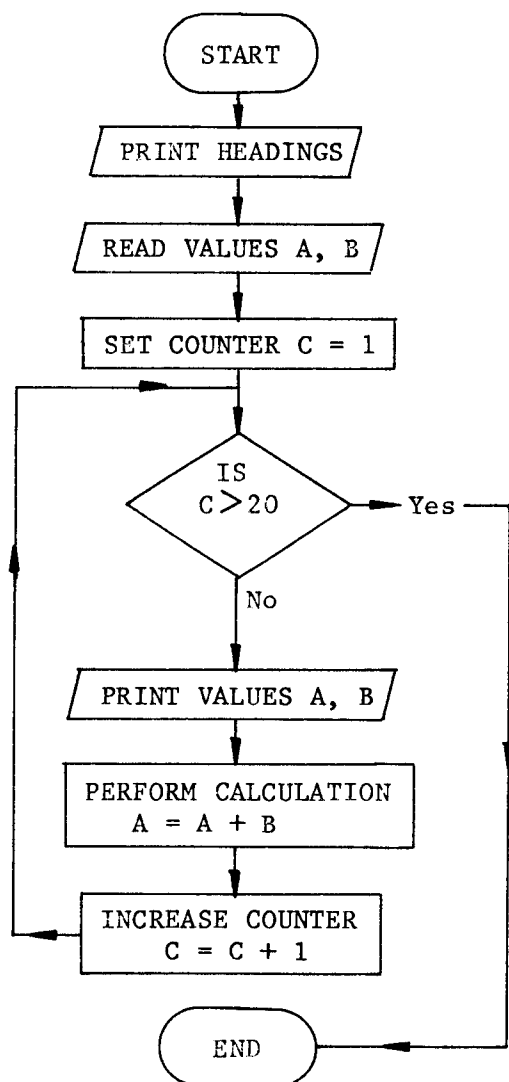Write a programme which will print:

EXERCISE 17

YOUR NAME

10	2
12	2
14	2
16	2
up to	
48	2

Here are the guidelines:

FLOWCHART   SENTENCES

```
      ┌─────────┐
      │  START  │                   Start programme
      └────┬────┘
           ▼
    / PRINT HEADINGS /              Print headings
           │
           ▼
   / READ VALUES A, B /             Read data for A and B
           │
           ▼
 │ SET COUNTER C = 1 │              Set counter initially to 1 so
           │                        that the number of loops may
           │                        be counted.
           ▼
         ◇ IS                       Is counter greater than 20?
         C>20 ◇ ──► Yes
           │                            If NO    print A, B
          No                                     increase A by B
           │                                     increase counter by 1
           ▼
  / PRINT VALUES A, B /                 If YES   end of programme
           │
           ▼
 │ PERFORM CALCULATION │
 │     A = A + B       │
           │
           ▼
 │ INCREASE COUNTER    │
 │    C = C + 1        │
           │
           ▼
      ┌─────────┐
      │   END   │
      └─────────┘
```

Note: The programme will LOOP until the value of C is greater than 20.

9.   Prepare guidelines for Exercise 19 (page 43).

10.   Now – follow the steps to solve this problem.

Exercise No. 20

Prepare guidelines
Write programme
Enter programme
RUN programme

You have purchased a car for $8 750. You paid a deposit of
$2 030 and obtained a loan for the balance over a term of 24
months. You have agreed to make a monthly payment of $280.00.

Your answer should show all details, and should include a table
showing month (1 to 24), Payment and Balance (after payment).

Some hints to help:

(a)   Use a counter to indicate the months 1 to 24.
(b)   The value of the counter can be printed.
(c)   First balance will equal Cost minus Deposit.
(d)   Each following Balance will equal (Balance minus Payment).

GOOD PROGRAMMING!

NOTE: Programmes for any question may vary in the order of steps.
        The only way to test whether a programme is written correctly
        is to RUN the programme.

        If an accurate result is obtained, then the programme is
        correct.

— CHAPTER 13 —
More Commands

This chapter introduces a number of additional statements and the work
involved is slightly more difficult.

Work the following examples to gain an understanding of the
statements.

LIST and RUN each programme.

INPUT STATEMENT

The INPUT statement allows data to be entered at the keyboard while
the programme is running.

```
Enter    NEW
         10   PRINT "ENTER YOUR NAME"
         20   INPUT N$
         40   PRINT "ENTER TODAY'S DATE DD/MM/YY"
         50   INPUT D$
         60   PRINT "HELLO ";N$
         70   PRINT
         80   PRINT "THE DATE IS ";D$
         999  END
```

LIST and RUN

LIST and RUN

RESTORE STATEMENT

The RESTORE statement instructs the computer to read DATA again, from
the first DATA statement.

```
Enter    NEW
         10   READ A,B,C
         20   PRINT B,C
         30   RESTORE
         40   READ A,B,C
         50   PRINT C
         60   RESTORE
         70   READ A,B,C
         80   PRINT C,B,A
         90   DATA 67, 102, 48
         999  END
```


(Try this without the RESTORE statements!)

SUBROUTINE

The instruction GOSUB directs the computer to go to the SUBROUTINE
section of the programme, which is identified by the statement number
following GOSUB.   The SUBROUTINE section is then executed and the
final statement in the SUBROUTINE is RETURN, which directs the
computer to return to the statement following the GOSUB statement.

```
Enter     NEW
          10  GOSUB 50              (go to start of subroutine 50)
          20  PRINT 2, 4, 6
          30  PRINT
          40  GO TO 999
          50  PRINT 1, 3, 5
          60  RETURN               (return to statement after GOSUB)
          999 END
```


DUMMY DATA

DUMMY DATA is data which is included to signify the end of DATA.   This
is useful when the amount of data is subject to change.

```
Enter     NEW
          10  READ A
          20  IF A = -111 THEN 999
          30  PRINT A,
          40  GO TO 10
          50  DATA 15,21,36,18,12,-111
          999 END
```


LEN (LENGTH) STATEMENT

The LEN statement determines the number of characters in a variable.

```
Enter     NEW
          10  A$ = "AUSTRALIA"
          20  B$ = "APPLE II PLUS"
          30  L = LEN(A$)
          40  PRINT A$,L
          50  L = LEN(B$)
          60  PRINT B$,L
          999 END
```


INT (INTEGER) STATEMENT

The INT statement will return a whole number, less than or equal to a
decimal number.

```
Enter     NEW
          10  A = 17.6582
          20  B = 21.1247
          30  C = 30
          40  PRINT A, INT(A)
          50  PRINT B, INT(B)
          60  PRINT C, INT(C)
          999 END
```

LEFT$, MID$, RIGHT$

These statements will allow you to extract selected characters from a variable.

```
Enter    NEW
         10  A$ = "AUSTRALIA"
         20  PRINT LEFT$(A$,4)          first 4 characters
         30  PRINT RIGHT$(A$,3)         last 3 characters
         40  PRINT MID$(A$,5,2)         starts at character 5;
                                        prints 2 characters
         50  B$ = "25/12/1982"
         60  PRINT LEFT$(B$,2)
         70  PRINT RIGHT$(B$,4)
         80  PRINT MID$(B$,4,2)
         999 END
```

VAL STATEMENT

The VAL Statement converts a string variable (or part of a string variable) to a numeric value.

```
Enter    NEW
         10  N$ = "1234"
         20  PRINT N$
         30  N = VAL(N$)
         40  PRINT N
         50  D$ = "10/11/1982"
         60  PRINT D$
         70  Y = VAL(RIGHT$(D$,2))
         80  PRINT Y
         90  M=VAL (MID$(D$,4,2))
         100 PRINT M
         110 D=VAL(LFFT$(D$,2))
         120 PRINT D
         999 END
```

Now you will progressively develop a programme using, as an example, data relating to students.

Work carefully through each section, following instructions given.

The problem you have been given is to write a programme which will return student information in different formats.

NOTES: 1. Be sure to enter statement numbers exactly as shown, to allow for further statements to be entered as the programme is developed.

2. Keep a printed copy of the programme LIST and RUN for comparisons as the programme is developed.

3. In Statement 800, enter today's date e.g. "DD/MM/YY".

```
10 REM TO PROCESS STUDENT RESULTS
20 REM VARIABLES DESCRIPTION
30 REM DATE        D$
40 REM NAME        N$
50 REM ADDRESS     A$
60 REM PHONE       P$
70 REM BIRTHDATE   B$
110 READ D$
160 H$="PERSONAL DETAILS"
180 PRINT H$
185 PRINT: PRINT D$: PRINT
190 PRINT "NAME","PHONE","BIRTHDATE","ADDRESS":PRINT
200 FOR R = 1 TO 3 STEP 1
210 READ N$, A$, P$, B$
230 PRINT N$, P$, B$, A$
240 NEXT R
245 PRINT
800 DATA "        "  (Enter today's date DD/MM/YY)
810 DATA "STUDENT 1", "4 HILL ROAD MORNINGSIDE"
815 DATA "396.1234", "17/10/67"
830 DATA "STUDENT 2", "138 MAY ROAD CARINA"
835 DATA "391.7222", "26/08/65"
850 DATA "STUDENT 3", "21 BAKER STREET CAMP HILL"
855 DATA "399.6214", "12/06/66"
9999 END
```

SAVE   as   STUDENT DETAILS

LIST and RUN   PRINT LIST and RUN

USING THE INPUT STATEMENT

At the moment, your programme is correct. If you had to run the programme next week, the date would be wrong.

To overcome this problem, the INPUT statement will be used. This statement will allow information to be entered at the keyboard while the programme is running.

Enter these statements:

```
110 PRINT "ENTER CURRENT DATE DD/MM/YY"
120 PRINT: INPUT D$
```

Delete:

Statement 800

SAVE   as   STUDENT DETAILS

LIST   and   RUN

PRINT LIST   and   RUN

When the programme reaches Statement 110, the screen will display:

```
ENTER CURRENT DATE DD/MM/YY
?
```

You may then enter today's date. Whenever the programme is RUN, the results will show the current date which had been entered at the keyboard.

ADDING MORE DATA

It would be useful if your programme could also provide a separate list of the student's class and the subjects in which each student is enrolled.

Enter these statements to describe the variables:

```
 75 REM  CLASS    C$
 80 REM  ENGLISH  E$
 90 REM  MATHS    M$
100 REM SCIENCE   S$
```

Enter these statements to include the DATA, which consists of the above variables in the order C$, E$, M$, S$.

(E = Enrolled   N = Not Enrolled)

```
820 DATA "9B", "E", "E", "N"
840 DATA "9A", "E", "E", "N"
860 DATA "9C", "E", "N", "E"
```

Change Statement 210 to READ the extra DATA:

        210 READ N$, A$, P$, B$, C$, E$, M$, S$

SAVE   as   STUDENT DETAILS

LIST and RUN

PRINT LIST and RUN

Notice that although the extra data has been READ, it has not affected
the results, as no instruction was given to PRINT that extra data.

USING THE RESTORE STATEMENT

In order to print another list containing students' names and
subjects, the DATA must be READ again. This is done by using the
RESTORE statement, which instructs the computer to read DATA again,
from the first DATA statement.

Enter these statements:

```
        280 H$ = "STUDENT ENROLMENT"
        300 PRINT H$
        305 PRINT :PRINT D$ :PRINT
        310 PRINT "NAME", "CLASS", "ENGLISH", "MATHS", "SCIENCE"
        315 PRINT
        320 RESTORE
        330 FOR R = 1 TO 3 STEP 1
        340 READ N$, A$, P$, B$, C$, E$, M$, S$
        360 PRINT N$, C$, E$, M$, S$
        370 NEXT R
        375 PRINT
        590 GO TO 9999
```

SAVE   as   STUDENT DETAILS

LIST   and   RUN

PRINT LIST   and   RUN

Your result should now show two separate lists, one for Personal
Details and one for Student Enrolment.

USING A SUBROUTINE

Where the same directions are to be used more than once in a programme, it is a good idea to use a subroutine. This will reduce the amount of typing in a long programme and ensure that the directions are performed exactly the same way every time.

Already, in your programme, two statements are identical. They are the READ statements 210 and 340.

Enter these statements:

```
700 REM SUBROUTINE TO READ DATA
710 READ N$, A$, P$, B$, C$, E$, M$, S$
720 RETURN
```

Change statements 210 and 340 as shown:

```
210 GOSUB 700
340 GOSUB 700
```

SAVE   as   STUDENT DETAILS

LIST   and   RUN

PRINT LIST   and   RUN

When the programme reaches the first GOSUB 700 Statement (Statement 210), it is redirected to Statement 700, then to Statement 710 to READ the DATA, then to Statement 720 which will RETURN the programme to the statement immediately after the GOSUB Statement. The programme will then continue until the next GOSUB 700 statement and the process is repeated.

USING DUMMY DATA

Your programme has only been designed to process the results for three students. What happens if you are asked to include details for more students? You could of course increase the counter, but you would then need to change every statement containing a counter, each time you had to include extra DATA.

Here's how to overcome this problem.

1. Increase all counters to a number which you know will be above the maximum required.

    By increasing the counters to 100, your programme will be capable of processing details for up to 100 students.

    Enter:

    ```
    200 FOR R = 1 TO 100 STEP 1
    330 FOR R = 1 TO 100 STEP 1
    ```

2. Enter a conditional statement inside each loop, after the GOSUB statement.

```
220 IF N$ = "9999" THEN 245
350 IF N$ = "9999" THEN 375
```

3. Enter "DUMMY DATA" as shown:

```
9000 DATA "9999", "99", "99", "99"
9005 DATA "9", "9", "9", "9"
```

When the DUMMY DATA is READ, the programme will branch to another statement.

By placing the DUMMY DATA statements at high statement numbers, you may insert additional DATA statements for additional students, if required.

SAVE   as   STUDENT DETAILS

LIST   and   RUN

PRINT   LIST   and   RUN

TO CENTRE A HEADING

Instead of printing the heading at the left-hand margin, you may prefer to centre it over the table.

Assume that you want to print on an 80 space line.

You could:

1. Count the characters in the heading (PERSONAL DETAILS = 16)
2. Subtract that number from the line length (80 - 16 = 64)
3. Halve that number (64/2 = 32)
4. Print Heading at TAB position 32.

However, the system will do all of this for you, by using the:

LEN (Length) Statement   To determine the number of characters in the variable.

INT (Integer) Statement   To return a whole number.

Enter these statements:

```
650 REM SUBROUTINE TO CENTRE HEADINGS
660 L = LEN(H$)          (refer Step 1 above)
670 T = INT(80-L)/2      (refer Steps 2 and 3 above)
680 PRINT TAB(T);H$      (refer Step 4 above)
690 RETURN

170 GOSUB 650
290 GOSUB 650
```

Delete these statements:

     180   and   300

SAVE   as   STUDENT DETAILS

LIST   and   RUN

PRINT   LIST   and   RUN

USING THE LEFT$, MID$, RIGHT$ STATEMENTS

With these statements, you may select specified characters from a variable to assist your programming.

```
e.g.    X$ = EXAMPLE
        L = LEFT$(X$,2)   Returns first two characters      EX
        R = RIGHT$(X$,3)  Returns last three characters     PLE
        M = MID$(X$,2,4)  Returns four characters, starting
                          with the second character         XAMP
```

When you run your programme, there may be occasions when you do not want to print both lists. The statements below will give you that choice.

Enter these statements:

```
130 PRINT "DO YOU WANT TO PRINT PERSONAL DETAILS?" :PRINT
140 GOSUB 600
150 IF LEFT$(Y$,1) = "Y" THEN 160
155 GO TO 250
250 PRINT "DO YOU WANT TO PRINT STUDENT ENROLMENT?" :PRINT
260 GOSUB 600
270 IF LEFT$(Y$,1) = "Y" THEN 280
275 GO TO 375
600 REM SUBROUTINE FOR PRINTING CHOICE
610 PRINT "ENTER YES OR NO AND PRESS RETURN" :PRINT
620 INPUT Y$
630 RETURN
```

SAVE   as   STUDENT DETAILS

LIST   and   RUN

PRINT   LIST   and   RUN

This is a useful function - when the programme is run, some operators would type "YES", but others might type only "Y". This example covers both types of input.

USING THE VAL STATEMENT

The VAL statement will convert a string variable into a numeric value. If you want to print the actual age of students, you could do this by comparing the student's year of birth with the current year.

To convert sections of string variables for birthdate (B$) and current year (D$) to numeric values:

    B = VAL(RIGHT$(B$,2))   Returns year of birth

    D = VAL(RIGHT$(D$,2))   Returns current year

To find age of student:

    A = D - B

Enter these statements:

```
380 PRINT "DO YOU WANT TO PRINT STUDENT AGES?" :PRINT
390 GOSUB 600
400 IF LEFT$(Y$,1) = "Y" THEN 410
405 GO TO 9999
410 H$ = "STUDENT AGES"
420 GOSUB 650
425 PRINT: PRINT D$: PRINT
430 PRINT "NAME", "BIRTHDATE", "AGE", "ADDRESS"
435 PRINT
440 RESTORE
450 FOR R = 1 TO 100 STEP 1
460 GOSUB 700
470 IF N$ = "9999" THEN 9999
480 B = VAL(RIGHT$(B$,2))
490 D = VAL(RIGHT$(D$,2))
500 A = D - B
510 PRINT N$, B$, A, A$
520 NEXT R
```

SAVE   as   STUDENT DETAILS

LIST   and   RUN   PRINT   LIST   and   RUN

NOTES: 1. You must keep this programme on disk or cassette, as you will be working with it again in the next chapter.

2. You could also compare the current month with the birth month, to get a more accurate age, by using the MID$ statement.

3. Student's marks could be entered as DATA (instead of E or N) to obtain a printed list of actual results.

— CHAPTER 14 —
Arrays

An array is simply a list that stores the values for a number of variables.

Using the data from the previous chapter, the array (N$) could be represented as:-

Col. 1	Col. 2	Col. 3	Col. 4	Col. 5	Col. 6	Col. 7	Col. 8
Name	Address	Phone	Birth-date	Class	English	Maths	Science

The array N$ now has eight columns - called elements - and they are referred to by the number of the element, e.g.

Name	N$(1)
Address	N$(2)
Phone	N$(3)
Birthdate	N$(4)
Class	N$(5)

English	)
	) Can you identify
Maths	) these elements?
	)
Science	)

If you want to use an array to READ and store all the information for one student:-

FOR E = 1 TO 8	(number of elements)
READ N$(E)	(to read element E)
NEXT E	(increase E by 1)

These statements form a LOOP - the first time through the loop E = 1 so the first DATA item (name) will be read and stored as N$(1). The second time through the loop, E = 2 so the second DATA item (address) will be read and stored as N$(2).

This loop will continue until all data has been read and stored under its own variable name.

BUT - if you want to READ and store DATA for more than one student, you must use a two-dimensional ARRAY (sometimes called a MATRIX).

This diagram represents the two-dimensional ARRAY (N$).

	Col.1 Name	Col.2 Address	Col.3 Phone	Col.4 Birth Date	Col.5 Class	Col.6 English	Col.7 Maths	Col.8 Science
Row 1	1,1	1,2	1,3	1,4	1,5	1,6	1,7	1,8
Row 2	2,1	2,2	2,3	2,4	2,5	2,6	2,7	2,8
Row 3	3,1	3,2	3,3	3,4	3,5	3,6	3,7	3,8

All details for Student 1 are stored in Row 1.

All details for Student 2 are stored in Row 2.

All details for Student 3 are stored in Row 3.

Details	Student 1	Student 2	Student 3
Name	N$(1,1)	N$(2,1)	N$(3,1)
Address	N$(1,2)	N$(2,2)	N$(3,2)
Phone	N$(1,3)	N$(2,3)	N$(3,3)
Birthdate	N$(1,4)	N$(2,4)	N$(3,4)
Class	N$(1,5)		
English	N$(1,6)	)	
		) Can you complete	
Maths	N$(1,7)	)	
		) the missing variables?	
Science	N$(1,8)	)	

To use a two-dimensional array to READ and store information for more than one student, you will need to use NESTED LOOPS, i.e. one LOOP which works inside another LOOP, e.g.

FOR R = 1 TO 3	(number of rows)
FOR E = 1 TO 8	(number of elements)
READ N$(R,E)	(read Row R, Element E)
NEXT E	(increase E by 1)
NEXT R	(increase R by 1)

THE NESTED LOOP is represented in a flowchart as:-
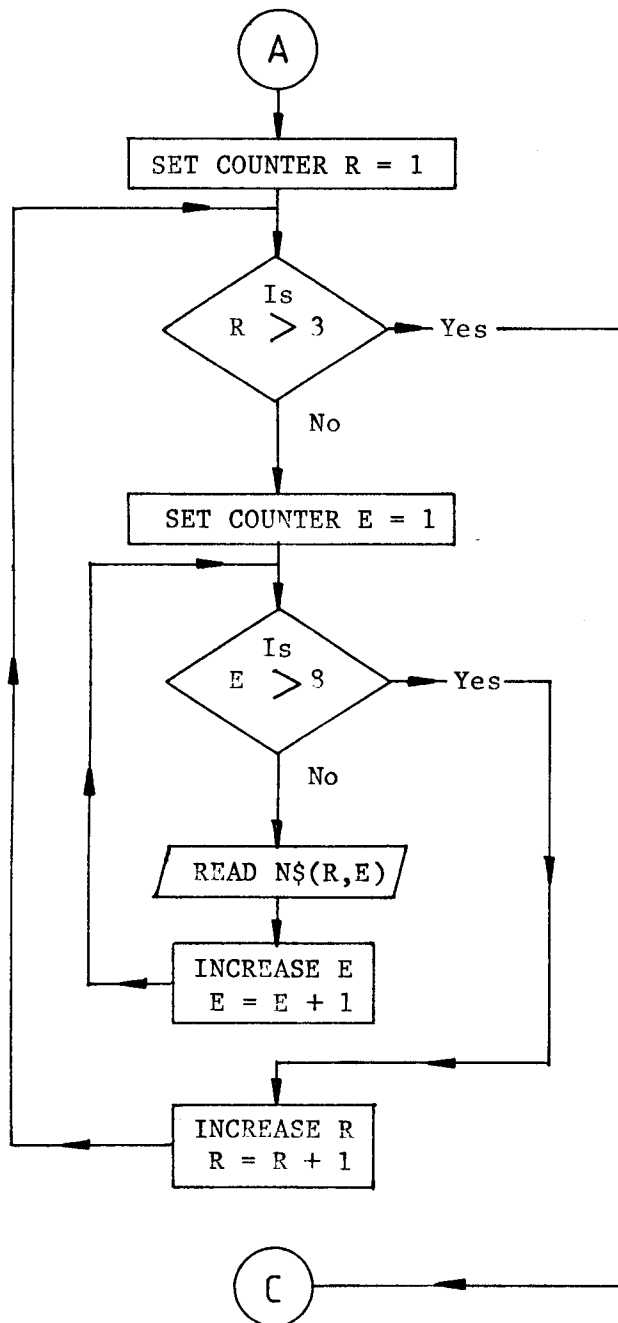
The inner loop (E) which reads the elements, is nested inside the outer loop (R) which reads the rows.

The two loops must never cross each other, for such a condition would stop a programme RUN.

Next section
of programme

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Now - to adjust your programme STUDENT DETAILS to use a two-dimensional array.

1. LOAD STUDENT DETAILS

2. Save under another name, e.g.

    SAVE ARRAYS

    This will allow you to keep one programme STUDENT DETAILS and a separate programme ARRAYS.

3. Delete these statements:-

40 to 100	Variables description
210, 220, 230	Portion of first loop
320	RESTORE statement
340, 350, 360	Portion of second loop
440	RESTORE statement
460, 470, 480, 510	Portion of third loop
700, 710, 720	Subroutine to read DATA

4. If the two-dimensional array contains more than ten rows, then you must use a DIMENSION statement to set the size of the array, i.e. the maximum number of rows, and the maximum number of elements.

    For your programme, you do not need a DIMENSION statement, but you may insert one for practice.

    Enter:

    05 DIM N$(100,8)

5. Enter these statements to identify the variables:

    ```
    35 REM NAME      N$(R,1)
    40 REM ADDRESS   N$(R,2)
    45 REM PHONE     N$(R,3)
    50 REM BIRTHDATE N$(R,4)
    55 REM CLASS     N$(R,5)
    60 REM ENGLISH   N$(R,6)
    65 REM MATHS     N$(R,7)
    70 REM SCIENCE   N$(R,8)
    ```

6. Enter these statements to READ and store all DATA:-

```
75 FOR R = 1 TO 100 STEP 1
80 FOR E = 1 TO 8 STEP 1
85 READ N$(R,E)
90 IF N$(R,1) = "9999" THEN 110
95 NEXT E
100 NEXT R
```

7. Enter these statements to PRINT details for "Personal Details":-

```
210 IF N$(R,1) = "9999" THEN 245
220 PRINT N$(R,1), N$(R,3), N$(R,4), N$(R,2)
```

8. Enter these statements to PRINT details for "Student Enrolment":-

```
340 IF N$(R,1) = "9999" THEN 375
350 PRINT N$(R,1), N$(R,5), N$(R,6), N$(R,7), N$(R,8)
```

9. Enter these statements to PRINT details for "Student Ages":-

```
460 IF N$(R,1) = "9999" then 9999
480 B = VAL(RIGHT$(N$(R,4),2))
510 PRINT N$(R,1), N$(R,4), A, N$(R,2)
```

SAVE   as   ARRAYS

LIST   and   RUN

PRINT   LIST   and   RUN

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— CHAPTER 15 —
Word Processing

INTRODUCTION

This chapter is to be used with the word processing programme "ZARDAX"
produced by Computer Solutions, Queensland. It is designed as a
self-paced instruction package to give an understanding of the Word
Processing or Text Editing capabilities of the Apple II Plus when used
in conjunction with the "ZARDAX" programme. Check the Manual
accompanying the diskette for details of slight modifications needed
to allow the Word Processing Diskette to operate.

You will also need another disk on which to save your documents. This
disk will be referred to as the DOCUMENT DISK.

When typing reaches the right hand side of the screen the next letter
will appear on the next line. No action need be taken as the system
will format the document when it is being printed. The programme will
produce a standard format unless you make adjustments. This will be
covered later in the chapter.

STARTING THE SYSTEM

1. Insert ZARDAX Master Disk in Drive 1 - turn machine on, and then
    close disk drive door. (If using DOS 3.2.1 System BOOT the
    system first).

2. When the red light goes off, the screen display will give you a
    choice of

            PRESS S FOR SET UP   or   PRESS ANY OTHER KEY.

    Press any key except S.

3. The MAIN MENU will now appear on the screen, and this will list
    the OPTIONS available.

    The most frequently used of these options will be covered in this
    Chapter:

    Create, Print, Retrieve, Delete, Glossary, Newdisk.

4. Remove the ZARDAX MASTER DISK and insert the DOCUMENT DISK in
    Drive 1. This will be used to store letters and other documents.
    Close drive door.

5. If the DOCUMENT DISK is previously unused it will need to be
    initialised (see p 52 for meaning of this term)

    To initialise - press N for Newdisk

The initialising process is used also to wipe a previously recorded diskette so be very careful when using this process. If the diskette you are using is full, initialise to wipe previously recorded documents. To guard against accidentally wiping a diskette it is wise to "write-protect" the diskette. This warning will appear on the screen.

6. To initialise press *. (Remember - Shift :). This process takes approximately 60-90 seconds, depending on the system.

7. After initialising, the MAIN MENU will again appear on the screen together with the number of sectors available on the diskette. An unused disk contains approximately 528 sectors. The screen display of the number of sectors available will assist in estimating the amount of space available on the disk.

LEARNING ABOUT THE OPTIONS

To select any option, simply type the first letter of the word.

CREATING A NEW DOCUMENT - TITLE: DOC1

1. From the MAIN MENU choose Create by pressing C.

2. Name of document - Type DOC1 - you may use up to 8 characters. If you don't use the maximum number then you must press RETURN to move to next step - if you use more than 8 it will stop printing at 8 characters and will return to next instruction.

3. Enter Notes: you could combine initials of author and date - or any other relevant details - maximum 11 characters.

4. The document name, author's initials and/or notes will appear at bottom of screen together with a number which indicates the position of the character in the paragraph.

5. Use SHIFT KEY normally in your typing. To type totally in capitals (upper case) press the CTRL key once - to release simply press SHIFT. You will hear a 'beep' when CTRL key is used for capitals.

   A space is indicated by a small dot and a return by a left arrow ◄┘ .

   Use ◄┘ to backspace to make corrections - this will remove the character before the cursor.

6. If no format instructions are given, ZARDAX has an assumed format for printing. Format instructions will be covered later in the chapter. The following exercise will use the assumed format.

Now type the following:

    Large companies have traditionally used computers to
    solve some of their business problems. Small businesses
    must also cope with the increasing complexity of information
    and the need for providing immediate information about their
    business and the extremely vital need to control business costs.

    The microcomputer is a system that the clerk-typist can use
    quite easily. It can be placed anywhere an office typewriter
    would normally be stationed.

TO SAVE ON DISKETTE

The document is in the memory of the computer. Should there be a
power failure it would be lost. If you wish to save the document for
future reference it is essential to save it on diskette.

1. Press ESC (Escape Key) to display the INNER MENU.
    The document will disappear from the screen but is still in the
    computer's memory.

The following options will appear on the screen:

    Change
    Draft
    Main Menu
    Print
    Rename
    Save
    Videoprint

    Which?

2. The INNER MENU lists options which refer to the document on
    which you are currently working.

    To select any option, simply type the first letter of the word.

3. Press S for Save - the red light will come on for a few seconds
    as the document is recorded on the diskette.

TO MAKE CHANGES

This document is still in the memory of the computer until you return to the MAIN MENU. To make changes or additions to this document now, call up Change from the INNER MENU - C. Previous typing will reappear on screen to allow you to make changes. Notice that the cursor is positioned at the end of your previous document.

Make the following addition to DOC1:

The microcomputer brings a new age to office automation. Now, the small businessman does not have to make his office fit the traditional computer system i.e. a separate central processor, mass storage device, printer or video display unit, or purchase expensive furniture to house this type of system.

The integration of hardware and software offers an outstanding total computer system for the small businessman.

NOTE: What you have on diskette is now different from what is in the memory of the computer.

SAVE THE NEW DOCUMENT - DOC1

REMEMBER: ESC - To return to INNER MENU

           S   - To SAVE

The old document is wiped from the diskette and the new document replaces it.

The new document is now saved with the extra paragraphs added.

RETURN TO MAIN MENU - M - DOC1 is now wiped from the computer's memory but is stored on diskette for future reference.

ASSUMED FORMAT FOR PRINTING

Unless you establish commands for printing, ZARDAX will assume the following format:

    Left margin set at zero
    Right margin set at 65
    Single line spacing
    Length of paper 66 lines
    Typing to finish at line 54
    No page numbering
    No justification
    Pitch 10
    Continuous stationery

TO FORMAT A DOCUMENT

To format a document means to establish commands for the printer - margins, line spacing, pitch, tab stops, page length, length of document, continuous stationery or separate sheets.

The basic command to the printer is CTRL-∅ which actually prints ≡. Be sure to press the CTRL and ∅ at the same time.

LEFT MARGIN: CTRL-∅LM followed by number -   ≡LM15

RIGHT MARGIN: CTRL-∅RM followed by number -   ≡RM65

PITCH: choice of 10 or 12 pitch
                        CTRL-∅PI followed by number -   ≡PI12

LINE SPACING: choice of
                            single - CTRL-∅SS   -   ≡SS
                            double - CTRL-∅DS   -   ≡DS
                            1.1/2   - CTRL-∅SH   -   ≡SH

PAPER LENGTH: A4 sheet normally 66 lines
                        CTRL-∅FL followed by number -   ≡FL66

TEXT TO END ON LINE: CTRL-∅PL followed by number -   ≡PL60

JUSTIFY THE RIGHT MARGIN:
                    i.e. to finish all lines
                        on right margin - CTRL-∅JU   -   ≡JU

                    To stop justification of text
                                    CTRL-∅NJ   -   ≡NJ

TEXT TO BE PRINTED ON SEPARATE SHEETS:
                                    CTRL-∅CS   -   ≡CS

CREATE A NEW DOCUMENT - TITLE: DOC2

Set the following format for DOC2:

There is no need to space or return between format instructions.

Left Margin 10; Right Margin 70; Pitch 12; Single Line Spacing; Length of paper 66; Printing to end 60; Print on Separate Sheets; No Justify

CHECK FORMAT INSTRUCTIONS:

        ≡LM10 ≡RM70 ≡PI12 ≡SS ≡FL66 ≡PL60 ≡CS ≡NJ   (Return)

TO CENTRE HEADING

CTRL-ØCE - type heading, and then press RETURN

Type CTRL-ØNC (To remove centering instruction)

Now centre the following heading in block capitals - use CTRL as Shift Lock

WIN THE PAPER WAR

CHECK: ≡CE WIN THE PAPER WAR ◄──┘
        ≡NC

Now type the following document

> Many small businesses today are staggering under an avalanche of paperwork. With spiralling wages it is harder and harder to keep costs down while managing the necessary workload. New technology has brought computers into the reach of most small businesses allowing them to reap the benefits previously afforded only to large organisations.
>
> The use of pre-packaged software is a large saving to small businesses because the cost of writing the programme is shared among the many people who use it. As the programmes have been previously tested, valuable time is saved.

SAVE THIS DOCUMENT ON DISKETTE

ADD THE FOLLOWING TO THE DOCUMENT - DOC2

(From INNER MENU - call up Change - this calls up the document from the computer's memory not from the diskette)

REMEMBER - TO CENTRE THE HEADING: CTRL-ØCE - type heading
                                        CTRL-ØNC

> DON'T BE A LOSER
>
> Your business could be losing money through inefficient collection procedures. Overdue accounts tie up valuable working capital and if not followed up can result in bad debts.

(Now change format to LM20 RM60 DS JU)

> The reports in this programme can save time and money by showing you which accounts are overdue and how long they have been outstanding. You can write your own standard collection letters which will be produced by the computer and will incorporate all relevant information.

(Now reset format to original instructions)

> At the end of the month statements can be generated auto-matically thus saving time and costly mistakes.

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RENAME THIS DOCUMENT - TITLE: RENAME

Return to Inner Menu (ESC)

Call up the RENAME OPTION by pressing R - rename this document RENAME
so you can easily identify it in the Main Menu.

You have only renamed the document which is IN MEMORY - but you have
not yet SAVED the renamed document on the disk.

From the INNER MENU press S (for SAVE) - the document RENAME will then
be saved on the disk.

PRINT COPY FROM MEMORY

In the FORMAT you indicated that printing would be on separate sheets
(cut sheets). If this document is too long for one page, printing
will stop. Insert paper in printer and follow instructions from
screen.

From the INNER MENU print a copy of this document:

1.   Call up PRINT by pressing P.

2.   Turn printer on and set paper to correct starting position.

3.   You will be asked how many copies you want before printing will
     start.

To stop printing

Use either ESC or RESET

Printer may not stop immediately - computer will immediately stop
sending further characters but the printer will continue to print
until it finishes all those characters which it had already received
and stored.

Reprint

During printing if you press R (Reprint) the computer will stop
sending characters to the printer until you press any other key. It
will start reprinting again at the beginning of the document - useful
especially if paper becomes jammed.

RETURN TO MAIN MENU

Remember that the document is now cancelled from the computer's memory
and unless you had saved it on diskette it would be lost. If there are
more than 21 files on the diskette, press space bar to see subsequent
entries in the catalogue.

MAIN MENU ON SCREEN WILL DISPLAY PROGRAMMES SAVED ON DISKETTE:

DOC1   )   Each programme name will be preceeded
DOC2   )   by a code   e,g,   A1   A2   etc.
RENAME   )

PRINT COPY FROM DISKETTE

As the MAIN MENU controls what is saved on diskette, call up PRINT by pressing P.

Identify document by code.

Turn printer on.

How many copies? - indicate by number.

Press RETURN.

PRINT A COPY OF DOC2 and RENAME

Check the format instructions and note the additional information in the RENAME document.

EDITING

To make changes to a document you must firstly retrieve it from the diskette, and transfer it to memory.

1.   From Main Menu press R for Retrieve.

2.   Enter the code for the document - DOC2.

3.   Document will appear on screen - cursor will appear at the end of the document.

PURE CURSOR MOVES

Hold CTRL and Letter down together otherwise CTRL will act as Shift Lock only. If this occurs press Shift to release lock and try again.

CTRL-B - moves cursor to beginning of text
CTRL-E - moves cursor to end of text
CTRL-R - moves cursor one space to right
CTRL-L - moves cursor one space to left
CTRL-U - moves cursor one line space up and to beginning of line
CTRL-D - moves cursor one line space down and to beginning of line

TO MOVE CURSOR QUICKLY

(a) Use the repeat key in conjunction with either of these combinations (ie holding 3 keys - CTRL-R RPT)

(b) CTRL- ∧ (holding 3 keys together - CTRL-SHIFT N) - moves cursor up 10 lines

(c) CTRL-V - moves cursor down 10 lines

PRACTISE MOVING CURSOR IN VARIOUS DIRECTIONS.

INSERTIONS

Position cursor at beginning of word where you wish to insert data and type - information is automatically added.

DELETIONS

To delete one character at a time - use ◄ or ► - sometimes referred to as 'destructive arrows'. The left arrow deletes the character before the cursor, the right arrow deletes the character at the cursor.

These 'destructive arrows' can be used in conjunction with the RPT key to delete sections more quickly.

MAKE THE FOLLOWING CORRECTIONS TO DOC2

Is your business in this category?

Many small business today are staggering under an avalanche

of paperwork. With spiralling wages it is harder (and harder) *delete*

ever-increasing

to keep costs down while managing the ~~necessary~~ workload.   New

technology has brought computers into the reach of most small

businesses allowing them to reap the benefits previously afforded *to* ∧

the

only ~~to~~ large/ organisations.

an immense

The use of pre-packaged software is ~~a large~~ saving to small

businesses because the cost of writing the programme is

users

shared among the many ~~people who use it~~.   As the programmes

trialled

have been previously ~~tested~~, valuable time is saved.

REMEMBER - what you have on the screen is now different from what is stored on disk.

SAVE THE NEW DOCUMENT - under the same name - DOC2

PRINT A COPY OF THE NEW DOC2 FROM DISKETTE (Remember - return to Main
Menu)

RETRIEVE THE DOCUMENT TITLED - RENAME

MAKE THE FOLLOWING CORRECTIONS TO RENAME

Your business could be losing money through inefficient
collection procedures. ʌ *Ø*verdue accounts tie up valuable
working capital and if not followed up/can result in bad
debtsⓞ *being incurred*.
The reports in *this* programme*ˢ* can save ʌtime and money by
showing you which accounts are overdue and how long they
have been outstanding. You can write your own standard
collection letters *which* will be produced by the computer/ⱼ
and will incorporate all relevant information.

At the end of the month statements can be generated

automatically thus saving time and costly mistakes.

SAVE THE AMENDED DOCUMENT ON DISKETTE.

DELETE A DOCUMENT FROM DISKETTE

Return to MAIN MENU.

Select D for DELETE OPTION.

Insert the CODE NUMBER for DOC1.

The document DOC1 will be deleted from the disk.

CREATE A NEW DOCUMENT - TITLE: TRAIN1

Set Format LM10 RM70 DS

Type the following:

> The increasing use of computer technology not only influences
> the way that businesses and organisations conduct their affairs,
> but also the way we live. The impact on people has been
> dramatic.
>
> A critical issue is whether or not the total number of jobs is
> increased or decreased by this technological innovation.
>
> The basic structure of employment has changed as many existing
> jobs have altered or been eliminated.
>
> New jobs have been created in computer-allied industries, such as
> retail outlets for computers as well as technicians to service
> machines.

UNDERSCORE

Position cursor at beginning of word.

To underscore one character - CTRL-Z.

To underscore whole word - hold CTRL and press Z repeatedly, for the
                           number of characters to be underscored.

To underscore longer sections of text - use RPT key with CTRL and Z.

TO REMOVE UNDERSCORE

CTRL-Y - one character; hold CTRL and press Y repeatedly to cancel
underscoring for a whole word.

PRACTISE UNDERSCORING WORDS AND REMOVING UNDERSCORE

TO MOVE PARAGRAPHS

1.   Position cursor anywhere within the paragraph to be moved.

2.   Press CTRL-M to enter Edit mode.

3.   MOVE U/D will appear on the screen. (U = UP   D = DOWN)

4.   On pressing U or D paragraph will move up/down to the next ◄⌐.
     Press U/D again and it will actually jump the whole paragraph.

5.   Press any other key to come out of edit mode.

6.   Now insert the extra returns.

MOVE PARAGRAPH 3 UP TO BECOME PARAGRAPH 2

MOVE PARAGRAPH 3 DOWN TO BECOME PARAGRAPH 4

DELETIONS

To delete larger sections of text - CTRL-W

"Wipe What? P/A/B" will appear on screen.

P - present paragraph - deletes from cursor to ◄─┘ which computer
    interprets as end of paragraph. If cursor is at beginning of
    paragraph it will delete whole paragraph.

A - deletes everything above cursor.

B - deletes everything below cursor.

If you decide not to delete anything when you have entered delete mode
- press any other key to escape.

PRACTISE DELETING SECTIONS OF YOUR DOCUMENT.

SAVE THIS DOCUMENT ON DISKETTE

USING THE TABULATOR

To move to tab position

      CTRL-T   - moves cursor to preset tab stops
                   - set every 10 spaces with the first tab on 12

To clear tab

      CTRL-T   - moves cursor to tab stop
      CTRL-C   - clears tab stop

To set new tab

      CTRL-S   - sets new tab

CREATE A NEW DOCUMENT - TITLE: TAB1

Centre this heading: TAB EXERCISE 1

Using pre-set tabs, enter:

5	10	15	20	25	30
40	50	60	70	80	90

Now - clear all tabs, and set new tabs at:

        5   17   29   41   53   65

Using these tabs, enter the same numbers as in your first table.

SAVE DOCUMENT ON DISKETTE.

PRINT TAB1 FROM DISKETTE.

CREATE A NEW DOCUMENT - TITLE: TRAIN2

Type the following:

      In an effort to ensure award coverage for all public sector
      professional engineers in Tasmania the Association has commenced
      proceedings to provide award coverage for the professional
      engineers employed by the Port Authority Tasmania and Transport
      Commission, Tasmania.

      This will then give the engineers concerned the opportunity to
      take matters such as reclassification to the Arbitrator in
      Tasmania.

FIND AND REPLACE   (Search and Substitute)

Sometimes you may wish to search for a particular word or group of
words in a document and substitute another word in its place (e.g.
month, surname, town).

1.   Type CTRL-B to return cursor to beginning of document.

2.   Press CTRL-F (Find)

3.   FIND: ?   Type the word with a space before and after.
            Type - engineers   (RETURN)

            (If searching for 'the' and no space is included
            before and after, the computer will select all 'the'
            combinations, even in the middle of a word.)

4.   REPLACE WITH: ?   Type replacement word with space before and
                  after.
                  Type - surveyors   (RETURN)

5.   The cursor will move to the first word it was to FIND in the
     text.

6.   As the first word is located you will be asked "Y/N/A"

        Y = Yes   N = No   A = All

If you press A - everytime this combination appears it will be deleted
and the new word/s will be substituted.

Otherwise you choose at each occurrence whether you wish that
particular word to be cancelled. If you press N at one particular
word, the cursor will move to the next location of the word for which
you are searching.

To escape from this mode press any other key.

PRACTISE THIS BY MAKING THE FOLLOWING SUBSTITUTIONS IN "TRAIN2"

1. Replace " award coverage " with " correct salaries "

2. Replace " Tasmania " with " Queensland "

    What did you notice - only two words were changed. The other two
    words had a full stop following the word. The system will find
    only the exact word or words you have requested.

LET'S NOW REVISE OTHER EDITING FEATURES

1. Move paragraph 2 to become the first paragraph.

2. Underscore three (3) separate words in the second paragraph.

3. Delete first paragraph.

4. Insert the following sentence at the end of the paragraph:

        The procedure involved requires that each Port
        Authority be declared a controlling authority.

5. Save the document on diskette.

STANDARD PARAGRAPHS

Create each of the following standard paragraphs as a separate
document:

Title for each document - PARA 1; PARA 2; PARA 3

PARA 1

    We wish to bring to your notice the fact that the above
    account is now overdue. We feel sure that this must be an
    oversight on your part and look forward to receiving a cheque
    within the next few days.

SAVE ON DISKETTE

PARA 2

    May we draw your attention to the fact that the above account
    is now overdue. Settlement by return mail would be appreciated.

SAVE ON DISKETTE

PARA 3

As we have received no reply to our previous letters regarding this account, we regret to advise that the matter has now been placed in the hands of our solicitors, Messrs Jones & Associates and you will be liable for the costs incurred.

SAVE ON DISKETTE

USING STANDARD PARAGRAPHS TO CREATE A NEW DOCUMENT

It is possible to merge several documents.

CREATE NEW DOCUMENT - TITLE: INSERT

Type the following paragraph:

An important task required in word processing is combining standard paragraphs to make a new document.

Follow these steps:

1. Position cursor where new paragraph is to be inserted - press return twice.

2. Press CTRL-I (Insert).

3. From list of documents saved on diskette choose code beside PARA2.

4. Paragraph will appear where cursor was positioned.

5. Return twice for new paragraph and type the following:

Each standard paragraph should be composed as a separate document.

Return to indicate new paragraph.

6. Call up PARA3.

Return for new paragraph.

7. Call up PARA1.

SAVE THIS DOCUMENT ON DISKETTE.

PRACTISE PRINTING COPY OF THIS DOCUMENT FROM DISKETTE - MAIN MENU

GLOSSARY

If using phrases or paragraphs regularly you can create a GLOSSARY which will reproduce these phrases quickly. Each glossary may have a maximum of 26 phrases which are coded by the letters of the alphabet.

TO CREATE A GLOSSARY ITEM

To indicate the beginning of the first phrase:

CTRL-∅ - twice   ≡≡(indicates beginning)

Type letter b   (code letter for this reference)

Type glossary entry

CTRL-∅ - 3 times   ≡≡≡(indicates end)

e.g.   ≡≡ bDear Sir ≡≡≡

CREATE A NEW DOCUMENT - TITLE: GLOSS1

Create the following items in this glossary:

FORMAT   - a - left margin 15; right margin 65; length of
                        page 66 lines; finish printing text on line
                        60; pitch 10; single line spacing.

e.g.   ≡≡ a ≡LM15≡RM65≡FL66≡PL60≡PI10≡SS≡≡≡ ◄┘

SALUTATION   - b - Dear Sir

e.g.   ≡≡bDear Sir≡≡≡

COMPLIMENTARY CLOSE   - c - Yours faithfully

                        4/5

                      Manager

STANDARD PARAGRAPH 1 - d - We wish to bring to your notice the fact
that the above account is now overdue. We feel sure that this must be
an oversight on your part and look forward to receiving a cheque
within the next few days.

STANDARD PARAGRAPH 2 - e - May we draw your attention to the fact
that the above account is now overdue. Settlement by return mail
would be appreciated.

STANDARD PARAGRAPH 3 - f - As we have received no reply to our
previous letters regarding this account, we regret to advise that the
matter has now been placed in the hands of our solicitors, Messrs
Jones & Associates and you will be liable for the costs incurred.

STANDARD PARAGRAPH 4 - g - May we draw your attention to the above
account, which has now extended considerably beyond our trading terms.
We regret to advise that until this account is settled, no further
credit can be allowed.

SAVE THIS DOCUMENT ON DISKETTE

RETURN TO MAIN MENU

HOW TO USE A GLOSSARY

1. Load GLOSSARY into the computer's memory - press G.

2. Screen will display - Which Document? - use the code beside
    GLOSS1.

    This glossary is now loaded into the memory and can
    be called up for use until a further glossary is loaded.

CREATE NEW DOCUMENT TO USE THIS GLOSSARY - TITLE: LETTER1

When you wish to take any item from Glossary - CTRL-G

Now create the following form letter - use FULL BLOCK STYLE WITH OPEN
PUNCTUATION.

1. Recall FORMAT - CTRL-Ga - insert Return

2. Type date and return 3-5 times.

3. Type inside name and address - Mr A Smith
                                    11 Far Road
                                    BRISBANE   4000

    Return 3 times.

4. Recall SALUTATION - CTRL-Gb - return 2

5. Recall STANDARD PARAGRAPH 4 - CTRL-Gg - return 2

6. Recall COMPLIMENTARY CLOSE - CTRL-Gc - return 2

7. Add your REFERENCE INITIALS

PRINT COPY FROM INNER MENU

As this is a standard letter, there is no need to SAVE it on diskette,
and so copy will be printed from the memory only.

CREATE NEW DOCUMENT - TITLE: LETTER2

When sending the sample letter to numerous people (i.e. form letter),
you can personalize the letter. Before printing the letter, you will
be asked to supply relevant details either from the keyboard or from a
prepared file of mailing addresses. Provision is made for this in the
draft of the letter. CTRL-8 will produce a curly left bracket { ;
while CTRL-9 will produce a curly right bracket } ; where information
can be inserted in the final printing.

1. Recall FORMAT (and press RETURN).

2. Type Date

3. CTRL-8 Name CTRL-9 { Name }

4. CTRL-8 Street CTRL-9 { Street }

5. CTRL-8 City CTRL-9...CTRL-8 Postcode CTRL-9

    { City } ... { Postcode } (If state required insert in brackets)

6. Recall SALUTATION

7. Recall STANDARD PARAGRAPH 2

8. Recall COMPLIMENTARY CLOSE

9. Type Reference Initials

PRINT COPY FROM DRAFT ON THE INNER MENU. It will print exactly as
shown on the screen - with curly brackets. This can be kept as a
sample.

PRINT COPY FROM PRINT ON THE INNER MENU. Choose from screen whether
information is to be entered from diskette or keyboard. Choose
keyboard. You will be asked to type information before printing
begins.

Addressee 1   - Mr A Person
                 123 Collins Street
                 MELBOURNE   3000

Addressee 2   - Ms J Johnson
                 24 Pitt Street
                 SYDNEY   2000

As these are personalised letters, there is no need to save them on
diskette.

RETURN TO MAIN MENU

ADDITIONAL PRINT COMMANDS

Try these commands on the documents you have saved. Remember – print commands can be used within a document to change format.

≡MA10   Sets an indentation from the left margin of ten spaces.

≡MAØ   Removes the margin command.

≡IN20   Does not affect the first line of typing, but indents subsequent lines by twenty spaces from the left margin.

≡MAØ   Removes the indent command.

≡PN1.40 For automatic page numbering at top of page. In this example, 1 = page number 1 and 40 = the position across the page where the number will be printed. Note that page 1 will not be numbered, but all subsequent pages will be numbered.

≡NN   Removes the page numbering command.

≡HD   Defines a HEADER (i.e. constant message to be printed at the top of each page except the first).

       e.g.   ≡HD
                  HEADING
              (2 blank lines)

           CTRL-Ø

≡HO   HEADER ON. After this command, the HEADER will be printed automatically at the top of each page (except the first).

≡HN   Removes HEADER ON command.

≡FD   Defines a FOOTER (i.e. constant message to be printed at bottom of each page, or for section titles).

       e.g.   ≡FD
              (2 blank lines)
                FOOTER
              (1 blank line)

           CTRL-Ø

≡FO   FOOTER ON. After this command, the footer will automatically be printed at the bottom of each page.

≡FN   Removes FOOTER ON command.

≡NP   New Page – next output will be printed on the next page.

Numbered Indented Paragraphs

Follow this example - make sure that JUSTIFY is OFF.

10.CTRL-ØIN6This is an example of numbered indented paragraphs. The number is printed at the left margin, but all following text is indented six spaces. Remove this command with CTRL-ØMAØ.

This example would print as:

10.   This is an example of numbered indented paragraphs. The
        number is printed at the left margin, but all following text
        is indented six spaces. Remove this command with CTRL-ØMS.

IN CONCLUSION

The main options available in this Word Processing system have been covered.

There are further options available which you have not covered in this chapter. Some of these options are outlined below:

LOCK   Lock a document on the diskette

UNLOCK   Unlock a document on the diskette

TRANSFER   Transfer document to another diskette

INDEX   Print the catalog on the printer

You should now be able to apply the basic principles to cover any further options with which you wish to experiment.

— CHAPTER 16 —
Characteristics of Computers

The cost of a computer is decreasing rapidly, and in the near future, computers will be used by the majority of businesses, and there will probably be a computer in most homes.

This chapter of SHAKE HANDS WITH THE APPLE presents an overview of the characteristics of computers.

COMPUTER SYSTEM

The computer system contains three main components:

An input device to allow the operator to give instructions and input information (data). The input device most commonly used is the keyboard, but magnetic tape and punched cards can also be used. Developments already under way will allow the human voice to input direct instructions.

A processor that performs mathematical and logical operations based on operator instructions and, as a consequence, produces results.

An output device to enable the operator to see the results produced by the processor. The output device may be a screen, a printer, or both.

COMPUTER CAPABILITIES

(a) Processing at extremely high speed for lengthy periods of time.

(b) Performing repetitive tasks accurately.

(c) Processing several jobs at the same time by moving quickly between programmes.

(d) Making decisions, based on instructions given.

(e) Performing arithmetic calculations and making logical decisions.

(f) Ability to control errors.

COMPUTER LANGUAGES

Each computer has its own MACHINE language which is very complex and binary in nature.

Machine language is called a low level language.

Information input to the computer is normally a high level language (i.e. more intelligible to humans than machines).

There are a number of high level languages available. Some of these are BASIC, COBOL, FORTRAN and PASCAL.

In order that high level languages may be understood by the computer, a special programme - called INTERPRETER - is in the computer system. The INTERPRETER automatically translates high level language to .machine language.

COMPUTER MEMORY

Computer memory is usually measured in BYTES.

One byte can contain one character or similar amount of data, and occupies one memory location.

One KILOBYTE of memory contains 1024 bytes, and the capacity of computer memory is normally expressed in kilobytes:

e.g.   4K of memory = 1024 bytes x 4 = 4096
      64K of memory = 1024 bytes x 64 = 65 536

The amount of available memory determines the quantity of instructions and data the computer can store.

A BIT is the smallest amount of information which can be held. In most microcomputers there are 8 BITS in one BYTE.

A NYBBLE is half of one byte, i.e. four bits.

COMPUTER SOFTWARE

A wide range of computer software is available for most computers. That software may be in the form of programmes specifically suited to businesses, to education or to the hobbyist.

COMPUTER LIMITATIONS

The computer is a machine - it can only act on the instructions given to it. For the computer to process information and provide output in the desired form, the operator must supply all initial information in the correct format, including the decision rules, the sequence of steps and the constraints.

Computers - like any other machine - are subject to breakdown as a result of various factors. It is wise to adhere to a schedule of preventative maintenance.

INDEX

Shake Hands with the Apple has been designed as an individualised programme to help you learn the operation of the Apple II Plus microcomputer.

All operating instructions relate specifically to the Apple II Plus microcomputer. Some of the instructions will also apply to other versions of Apple microcomputers.

Shake Hands with the Apple is written in an easy-to-understand style which assumes no knowledge of computers or computing jargon. It takes you through from simple programmes and programming to graphics and word processing.